TELEPHONE ENGINEER

Vol. I CHICAGO, MARCH, 1909 No. 3

You—Who Use Wire Joints

—You—who want the BEST, but are in doubt
—You—who are "from Missouri" and must be shown
—You—who prefer *proofs* to conversation

LISTEN:

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Other Joints Before Twisting — Other Joints After Twisting

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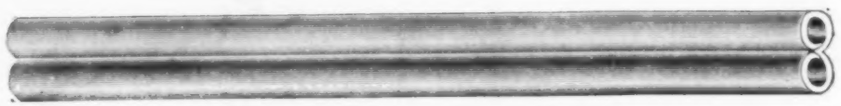

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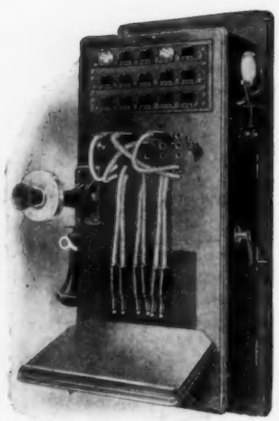

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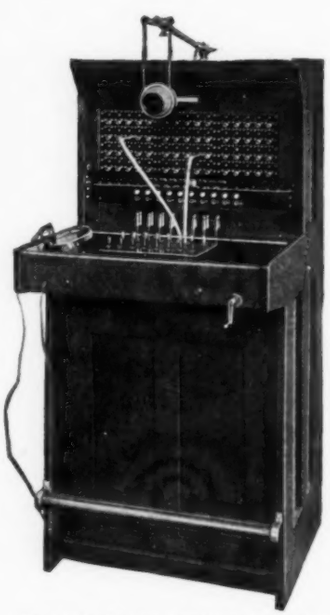

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CHICAGO, MARCH, 1909.

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THE LEGAL BATTLE ENDS.

IT was a hard, long contest, this litigation brought by the minority stockholders of the Kellogg Switchboard & Supply Company, against the American Telephone & Telegraph Company, and the result came rather unexpectedly, although most happily for the plaintiffs. The trial has meant much to the minority stockholders who for nearly six years have persisted in a hearing for their alleged rights. The sacrifices they made, however, have not been wholly unselfish. They were convinced from the start that an equity existed for them and they fought hard for their personal rights. Their victory, though dearly won, gives them only what was theirs at the beginning of the trial, but outside independent telephone interests will quite probably claim all the honors.

The encomiums properly and rightfully belong to Milo G. Kellogg, Francis W. Dunbar, Kempster B. Miller and Geo. L. Burlingame. These men have never wavered in the campaign so long drawn out at such enormous cost in mental strain and dollars. The hero-worshipers will all find out, sooner or later, where to send the flowers, and the men we have named will get them.

There has been a lot of confusion about this litigation. Many people well versed in other matters pertaining to the case, are inclined to give all the credit to Milo G. Kellogg. National and state associations have poured forth their resolutions of condolence and sympathy for him, but it must be remembered that in the absence of the minority stockholders' bill, Mr. Kellogg could not have regained his property.

By virtue of the favorable decision to the minority stockholders, the whole transaction involving the sale of the Kellogg company to the American company is declared void. In the decision of the court this means that the Kellogg company has always been an independent telephone manufacturer. Of course, this being true, Mr. Kellogg has always been the controlling factor. Asked for an expression, Mr. Kellogg gave us this:

"In response to your request for some statement from me concerning the decision of the Supreme Court just rendered in the litigation concerning the control of the Kellogg Switchboard & Supply Company, I will state that such decision is what I have always confidently believed would be the final outcome of the litigation, notwithstanding certain decisions in the lower courts to the contrary. In a statement which I published in 1907, I said:

"'There seems to be no question but that in view of the decision handed down by the Supreme Court, * * * the final decree will be that I never ceased to be the owner of my original stock and am now the owner of it.'

"The decision of the Supreme Court sustains practically all the allegations of the bill of complaint of the minority stockholders and gives practically all the relief that was asked for in the litigation.

"In conclusion I will say that the company will be managed in the future as an independent telephone manufacturing proposition along the same lines of high grade apparatus and progressive ideas which characterized it from its organization while I was formerly in its control and that it will be impossible for

adverse interests to regain control of the company.—Milo G. Kellogg.

Consistent with his prevailing fairness, Mr. Kellogg carefully places the credit of the triumph of the independents where it properly belongs. He assures everybody, once he regains possession of the plant that "it will be impossible for adverse interests to regain control of the company."

This embroglio has been a marvelous proposition all the way through. We have wondered how a manufacturing plant presumed to have been shaken to its financial foundation by the failure of a syndicate, could make such amazing progress in the hands of alleged "bucaneering pirates." It is known that Mr. Kellogg gave his brother-in-law, Mr. DeWolf, a broad power of attorney to use, if necessary, to save the business. Mr. DeWolf in assuming the management of the Kellogg company, retained much of the old staff and gathered to his assistance from the ranks of independent telephony some of the best timber available. These men have continued a manufacturing and selling organization second to none. Their combined effort has always held to the making of such high-grade apparatus that it sold in the competitive open market in spite of the bitterest attacks ever waged in commercial warfare. The company was virtually boycotted by many of the state associations who went on record in their assaults. In at least two instances, where an effort was made to display apparatus at state conventions, its literature was destroyed and large silken banners were slitted and dragged about the corridors. It was not permitted to make exhibits of its product. It was denied the use of the International association's stamp. It was not allowed to advertise in telephone journals—the publisher's penalty being wholesale cancellations of other independent telephone manufacturers' advertisements. The fight was treacherous!

But now some red fire will be burned. There will be more national and state resolutions; Stan Lichty will say: "Now, you Indians, come across;" other independent manufacturers will hurry out a new "dope sheet" to their traveling salesman. Everything will change—all to the glory of the cause of sentiment! A few pails of water will be poured on the guns whose constant fire has been directed against the Kellogg company; the sky will clear. Those competing independent manufacturers who have not sent telegrams of congratulation to the winners will do so—*aber nicht*. Isn't it rich, this bunk of the business?

And in the face of all this, how about the Kellogg company's product? Its bully. Moulton uses it; Gary uses it; Hoge uses it; why, even Jim Barnett can now point with pride to his old board, because it *is* a Kellogg!

We are praying for adversity to hit us some day in the same way. When Mr. DeWolf took the Kellogg plant the stock was an alleged scare-gamble at 75. Since he has had it—with all the muck that could be hurled his way, he has managed to pay a fifty per cent cash dividend and if you wanted some of the stock today it would be a good buy at 400. Pretty poor, eh?

And just while we're all "het up" about this thing, have you noticed that the Kellogg company is still making the apparatus that needs no apology? It has never tried to do anything else—just stuck to telephones, switchboards and apparatus—no frills, always straight business.

It isn't flirting with any side lines. It doesn't try to make ignition dinguses, or kerosene lamps, or safety razors, or desk lights, or washing machines, or tin toys, or vibrators, or clocks. It is a manufacturing plant that has prospered by attending strictly to its business of making telephone apparatus. Every knock has been an actual boost.

DREAMS THAT COME TRUE.

He must be a keen observer and a wide reader who can keep fully informed on the scientific developments of the passing days. So many former mere scientific toys have achieved a recognized place in the industrial arts; so many laboratory experiments have evolved suddenly into world-important significance, that our faculties almost refuse to grasp the changes as they occur.

Wireless telephony, even now, is viewed by many as a plaything rather than a factor in the commerce of the world. Its adoption on ships of the navy and of navigation companies is often regarded, by the practical electrical man, as well as the layman, more as a concession to the spirit of invention than as a business improvement. And while we wonder and speculate as to whether the wireless talking apparatus ever will become really practical, the companies which manufacture it are erecting stations and equipping vessels and bidding on contracts much as other manufacturers do business. It is very real and practical to them.

We often ponder over the great timber problem of the world; and we speculate as to what the railroads will do for ties, and the telephone companies for poles. Yet when we stop to think, we distinctly recollect an illustrated advertisement of at least one railroad, showing distinctly a series of concrete ties vanishing in perspective. Furthermore, we have seen proof that telephone poles made respectively of concrete, glass, and steel construction, are doing actual service without eliciting the slightest expression of surprise from those who are accustomed to seeing them.

The sending of pictures by wire—or rather, to suit the stickler for technicalities, the reproduction of a picture by means of impulses sent over a wire—engaged our momentary attention some years ago, when a method for doing it was discovered. Discounting, as usual, the accuracy of the statements read at the time, we casually wondered if a successful system of the kind would not some day be evolved; and then promptly forgot the matter. Meantime the operation has been so perfected that one may not only reproduce at a distant point either drawings, manuscripts or photographs, but he may do so without wires!

The telephone repeater some years ago became, to the inventor, almost the *perpetuum mobile* of telephony. Learned dissertations were propounded by men of science, noted physicists, in proof that the principle of the telephone repeater was impossible of practical application. It was pointed out that an apparatus capable of relaying or reinforcing the feeble fluctuations of the voice currents must needs be more sensitive than the instruments which produced and responded to those currents; and this, it was declared, was manifestly impracticable. And so the matter was put aside by those who were not afflicted with the inventive germ, and became merely a subject for abstract discussion. And yet, today the telephone repeater is in actual use; in a small way, it is true, creeping rather than making any industrial strides, but still successful.

It was not so very long ago that we rather scoffed at the automatic telephone. It was an interesting dream—just the kind of foolish scheme one might expect a

typical inventor to incubate; but quite impractical. Yet today the automatic is commonplace, and we are looking beyond it to the possible duplexing or quadruplexing of the telephone line by some mysterious harmonic process.

We have dreamed of a combination of telephone and phonograph, making the instrument hold its speech until such time as we desire to hear it. But others have dreamed to more purpose; and so, somewhere, the combination is actually working.

We are still waiting for submarine cable telephony, for more nearly continuous use of wires that are idle most of the time, even for that seemingly trivial matter of improvement in the mechanical form of those instruments with which the subscriber is brought into actual physical contact. But some day we shall look up from our daily work to find that these problems have been solved, and have in turn become commonplace. Perhaps we might even successfully guess at some of the newer dreams that will take their place.

SOME EVOLUTIONARY CONDITIONS.

EVERY little while you find it breaking out again and sometimes in a new place. Out in Webster City, Iowa, Ed Martin has a little octopup of a telephone system all his own. He used to own a great string of exchanges and toll lines—a regular vaudeville circuit. He could race around in several counties and call himself up on his own lines from nearly every farm house. Later, he organized some local companies, sold his holdings here and there till there was little left to him except the Webster City plant and its out-of-town connections.

In Iowa they point to Martin as a successful telephone man. When you see his picture he always has on a dress suit.

But now he's having some trouble with the farmers. A farmer is usually everything but a business man. This isn't intended for a bump at the farmer, but he is always inclined to see things from his point of view. If he contracted for telephone service at $1.00 a month ten years ago, and has enjoyed the service right along at that rate, that establishes precedent sufficient to endure till the crack of doom. Martin's farmers want something more than the best service he can give them. They are insisting on free county service; daily market and weather reports; service from 5 a. m till 10 p. m. and urgent calls at all times. And if they don't get it, they will build a little system of their own. Now, how would you beat a game like that?

This is what Martin told his obstreperous customers: "When I made this $1.00 rate to you, my labor cost 50 per cent less than it does now. The material entering into the construction and equipment of lines cost me 60 per cent less than it does now. I then bought your corn at fifteen cents per bushel; your oats for ten cents; your butter for ten cents and your eggs for six cents. I didn't give you free service in the beginning, but if you will go back to the old prices for your produce, I'll be game and render the service you demand."

There are some ways to get a rate, but nothing ever seems to go so far as the service itself. Martin held the custom of the most of his farmers. It is interesting to note that this little controversy developed the rather startling fact that the $12 rural service was costing the Martin Telephone Company $20.40 per annum.

But Martin is going into the five-cent theater business as a side line and his profits there will doubtless tide over this trifling deficiency in the telephone business.

THE SPRING BUSINESS.

THERE is a general report emanating from the several competing telephone manufactories that business conditions are better. The emphasis attending this unanimous expression is scarcely audible, but the truth is apparent. Optimism has carried through some pretty frail enterprises, but it isn't needed in the telephone industry. There is no element of frailty about it. Something besides the panicky times has been at the bottom of the stagnation prevalent during most of the past two years. Remedies are being found among the operators and the manufacturer is consequently more cheerful, hoping always that his prestige of the past will bring him his share of the current orders.

Most of the manufacturers have been resting on their oars. Their shop clean-up has been complete. Very few have attempted to pile up product for an anticipated rush. Short shifts have kept close up with the imperative demands for apparatus. The warehouses are depleted. Excess stocks return no immediate profits.

There will be constantly increasing business leading up to the spring construction period. It will not be the reputation of the house that will hold a hurry-up order that won't hurry. The demand will be, "When can you ship?" The manufacturer who is ready will reap the greatest harvest and will create new customers who will cherish the memory of such enterprise. This is a most seasonable time to put on a full force and be prepared for the certain demand. The requirements of the telephone operator are vitally urgent and important. The manufacturer who comes nearest to serving the operator can hope to win his pleasure and patronage and to hold it into the future. The preparedness of the manufacturer will mean much during the next few months.

TELEPHONE EXCHANGE BUILDING.

IN the practical commercialism of the day, as indicated by the design of municipal and state buildings in the mold of warehouses and factories, it is interesting to note the marked tendency of telephone exchange architects to adhere to at least a suggestion of the æsthetic. Well designed telephone buildings continue to exhibit a pleasing relationship to library and school structures, thus placing them in a class with the higher civilizing influences, at least in outward form.

The effort to add artistic grace to the less utilitarian portions of the interior is very commendable, aside from the credit that is due the telephone companies for their efforts to create pleasant surroundings for their employes. It is the experience of that new profession, social engineering, that these things are well worth while to any concern whose efficiency depends in great measure upon the psychological condition of its workers.

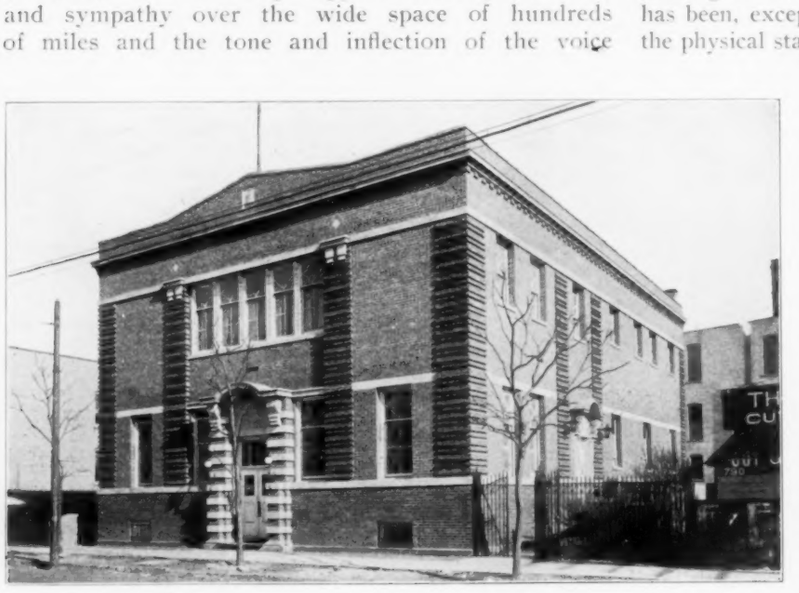
But that architects in general do not grasp the peculiar technical requirements of the modern telephone exchange is common knowledge among manufacturers of exchange equipment. The drawings of floor plans and sectional elevations of proposed telephone buildings which accompany specifications in ordering often show constructions which interfere sadly with the manufacturing engineer's effort toward economical distribution of apparatus, and which might easily have been avoided by a little study of the conditions to be met. Furthermore, those little details which could so easily be furnished, yet whose absence is so annoying, indicate the amount of consideration the architect may or may not have given the problem before him.

Telephone Exchange Architecture

By Irving K. Pond (In the Architectural Record)

THIS is, possibly, the first general word concerning the characteristics of telephone exchange buildings to appear in an architectural journal. The special nature of the problem is such as not to awaken more than general interest either in the public or in the architectural fraternity. But few architects are called upon to consider the problem, and while a great public is served from within these structures, this public does not make that direct personal use of the telephone exchange that it does of the office building, the church, the penitentiary or the theater. In fact, the telephone exchange bears about the same relationship to the generality of public buildings as does the stage of the theater to the auditorium or, more correctly, as the mysterious portion back of the footlights, with its traps, its galleries, its bridges, its grid-iron, its rigging, its dressing rooms, property and scene rooms, bears to the front, with its gay proscenium, its sumptuous loges, broad foyers and stairways and its resplendent decorations. The nerve center of the telephone life is in the exchanges, where a mysterious mass of complex ganglea gathers the plans and desires of one-half of the community and spreads them to the other half. So flexible in its operation is this net-work of wire nerves and withal so potent, that one may sit in the security of his own room the while he tells his neighbor just beyond the party wall exactly what he thinks of him; or one may appeal directly for aid and sympathy over the wide space of hundreds of miles and the tone and inflection of the voice is carried to make clear the meaning and intent of the word. Nature has been some little time in perfecting through evolutionary processes the nervous system of the human being, which now, to all appearances, has reached the final state. For many centuries the church and the theater have been shaping the forms most perfectly adapted to their special requirements, and from now on nothing in these can be more perfect or beautiful than has been, excepting only the mechanical arrangement of the physical stage. But it was only yesterday, as it were, that a personal friend, who has detailed the experience to me, heard the first word spoken through the telephone. It is not strange, then, that the nervous system of the telephone exchange is not absolutely perfect and final in its development, and that the exchange building has not been "standardized." Not only does the mechanics of the system alter and improve, but the clinetele in a certain district enlarges and changes in character, so that a building and equipment deemed perfect and entirely adequate a few months ago now presents a vexing problem to the telephone engineers. A building impossible or impracticable of enlargement standing in the center of a district which it is inadequate to serve is a very vexing and economic engineering proposition. Five years ago, or less, even, the present extent of telephone service was not dreamed of, and but slight opportunity for growth was

Chicago Telephone Company's Irving Park Exchange.



Humboldt Exchange of the Chicago Telephone Company.

provided in the exchange. Today but a fraction of the ultimate is developed in the newer buildings. The economics of the situation is studied by the engineer, and—"to a required degree of approximate accuracy"—the ultimate being determined upon, the structure is planned and designed with that in view. The possibilities of growth with the least disturbance to existing conditions of service and mechanics are most carefully considered. The "frame" rooms are made capable of consistent enlargement; in the "operating" rooms the switchboard may be extended in time or switchboard space may be augmented by the introduction of galleries. None of the exchanges described exhibits a completed design. The new eight-story "Toll and Long Distance" exchange of the Chicago Telephone Company is susceptible of a seven-story enlargement to an alley on the north, the basement and first story of this addition being already completed. Again, the building is capable of an almost unlimited extension across the court to the south. "Humboldt" exchange may be enlarged by a three-story extension to the rear and a third story over the present building, for which the steel structure and the exterior design are adapted. The "Lincoln," "Edgewater" and "Kedzie" structures are designed for an ultimate of five stories, and the facades are but a fragment of the design. "Irving Park" exchange is to be enlarged one hundred per cent in the rear and have a second story over the entire augmented ground area. In all cases it has been the endeavor so to design the structure that addition and enlargement may be made with the least amount of alteration in or destruction of the existing portion, and to the end that the building may not present too unfinished an appearance in its temporary condition. The ultimate operating room in which are the switchboards determines the character of the plan. The long room, with a line of boards at either side, with ample space between, free of columns, for the chief operator's desk and freedom of movement for the supervisors, lighted and ventilated fore and aft, with light also on one or both of the long sides, is perhaps the ideal form for city exchanges, and has been developed to a point of perfection in such exchanges as "Edgewater," "Kedzie," "Lincoln," etc., of the Chicago Telephone Company, and has been suggested in "Toll and Long Distance," where, however, conditions did not warrant the fuller development of the scheme. The absolute accuracy of space measurement required for the installation of the inflexible apparatus of the telephone service, the almost absolute lack of any leeway in the location of cable wells, slots, etc., make the structural planning, and especially the supervision, matters of extreme delicacy. The tele-

A Fireplace. Chicago Central Exchange.

Operators' Rest Room, Kedzie Exchange, Chicago.

phone engineers locate cable wells, for instance, to the sixteenth of an inch. Sometimes, possibly, the builder, in heavy fireproof construction, shades that one-sixteenth a trifle, but no well-trained telephone engineer will admit that he is justified in so doing! The multiplicity of raceways, conduits and ducts for lighting, house telephones and signals, for the special wiring in connection with mechanical and telephone systems, threading the floor construction in all directions, make close study of the floor section a matter of utmost importance; not infrequently fuel and illuminating gas pipes and tubes for pneumatic service thread this maze of electric conduits and tax the ingenuity of the designer who is figuring close on weight and material in the interest of economy. The city exchanges are substantially of fireproof construction, and in exposed localities are carefully guarded from attack of fire from without by metal window frames and sash and wire glass. Fireproof shutters are also installed as a further protection against undue heat, which may ruin the sensitive apparatus.

In general, the layout of the plant in a three-story exchange is as follows: In the basement are the heating plant, the engineer's room and the mens' toilet, the storeroom for district and line supplies, the battery room, the pot-head room—the pot-heads being the terminals of the cable ducts which enter from without. In the first story are the district managers' offices; the frame room, in which are the intricately wired "frames" on which are separated and distributed to the switchboards the multitudes of wires branching from the cables at the pot-heads. A portion of the first floor is used for store and work room, and in the vestibule generally is placed the public telephone. Outside of necessary hallways, stair and elevator wells, the second story is devoted to the switchboards at which the operators make the connections. In the third story are the rest and recreation rooms for the girls who remain in the building during the off-period (for the girls have a period of rest after two hours' service at the board). The rest room is equipped with easy furniture, books and papers, and in the recreation room are provided games. Adjoining these rooms is the lunch room, where luncheon is served free to the operators, and beyond are the locker and the toilet rooms, each up to date in its furniture and fixtures. In the rear of the third story at "Lincoln" is a men's club room, with toilet room, a fireplace and a platform for lectures and talks. Where space permits, a flower garden is laid out upon the lot and carefully tended in a measure by the girls themselves. The garden is a feature, and when it cannot be accommodated at ground level it is placed upon the roof. "Toll and Long Distance" and "Lincoln" are to have extensive roof gardens. "Humboldt" has a beautiful garden spot at the operator's entrance. Window boxes, as will be noticed in the illustrations, are a common, almost general, feature of the buildings. An eminent critic, writing not so long since in the *Architectural Record*, placed the telephone exchange in the factory and warehouse class, and severely criticised the slight architectural embellishment of the "Humboldt" exchange as out of place in a utilitarian structure. It is easy to set up a dummy of straw and then knock it down. It is not so easy to tell just how far to carry ornamentation in any kind of a structure, utilitarian or otherwise. But the telephone exchange partakes of the nature of an office (in no sense a shop or factory) building and of a club of girls, and such being the case I do not believe ornament or the element of beauty and domesticity are likely to be carried to a fatal extreme. It is not the function of the play of color or of the bits of carving about the entrances or of the bright flowers on the window ledges to command "Abandon hope all who enter here"; but rather the function is to invite to labor: "Come, work, rest, recreate and work again amid pleasant surroundings, and enjoy at least a bit of the beauty to which your work entitles you." From what we know of the highly wrought nerves of many of the telephone users, and from our knowledge of the intricacies of the telephone system, we must feel that there is wisdom in providing for the operators these havens of rest in its telephone exchanges.

Telephone Traffic as a Business Index

By Frank F. Fowle

BUSINESS men are universally accustomed to gauge the general business activity by the volume of trading in commodities which are consumed on a very large scale, such as iron, steel, foodstuffs, etc., and by the earnings of the railroads and by bank clearings. Information in this regard is spread weekly over the entire country and comparisons are made with the previous week and with the corresponding week of the previous year, in order to indicate the trend of business at the current moment. The consumption of any general commodity on a very large scale, whether it be money, transportation, building materials or manufactured products, may be regarded as showing by the weekly or monthly volume of transactions the general business activity or state of prosperity. The large public service companies now do business on so great a scale that their transactions may properly be regarded as furnishing an index to the general demand and the condition of business.

Telephone service has come to be a great public necessity, and the daily use of it in messages runs into enormous figures. The total number of telephones in service now approximates 6,000,000, and the annual gross revenue is many millions of dollars. It becomes of interest, therefore, to speculate upon what the relation of telephone traffic and revenue to the general business activity may be. Telephone traffic originates in the daily course of business of almost every conceivable sort, and is to the same degree cosmopolitan in its character as is the passenger traffic upon any of our great transportation systems. It originates with no particular class or community and it serves no interest exclusively. In reflecting, therefore, upon the probable sources of stimulation or depression in the telephone business, it would appear reasonable that the business must prosper in about equal measure with the sum total of other business in the community. A telephone plant is one of the greatest of modern business machines, and financially its success must rest, not upon artificial stimulation or social demands, but upon the demands of commerce and its ability to serve the business man as a time saver and a money maker.

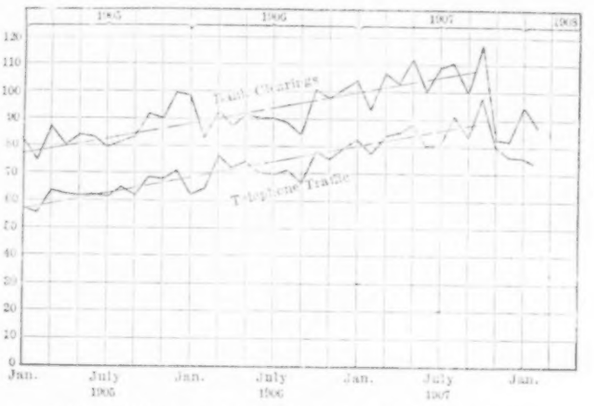
The writer recalls the statement of a telephone enthusiast, some eight years ago, that the telephone busi-

ness had no "rainy days." This unquestionably is true with regard to such violent fluctuations as occur in some lines of manufacturing, such as steel rails, when a heavy business reaction sets in, such as that of 1907. That the telephone business, however, continues to be uniformly prosperous while general business experiences a setback seems improbable.

The writer undertook, in a small way, an investigation of this subject and made a comparison of originating toll traffic and total bank clearings in a zone having a population of approximately 2,500,000. The comparison covered a period from January, 1905, to February, 1908, and the illustration shows the relative value of toll traffic in messages and bank clearings in dollars. The general agreement between the two curves is quite remarkable; a comparison of the slopes of corresponding portions of the curves shows 30 cases of agreement and seven cases of disagreement as to direction; that is, there were 30 cases of simultaneous increase or decrease of traffic and clearings and seven cases where one increase while the other decreased, the percentage of agreement in the total number of comparisons being 81. Aside from this detail comparison, the general similarity in growth is very noticeable, but even more remarkable is the slump in both curves with November, 1907, following the October panic. This effectually disposes, in one specific case, of the theory that the telephone business is immune from the general fluctuations of business. Local telephone traffic in the same territory fell off fully as much as the toll traffic, and a considerable reduction of the operating force was possible. In the interval between February, 1908, and the present time, both clearings and traffic have been increasing slightly and are now nearly uniform with the corresponding figures for last year.

This comparison just given corroborates the theory that telephone traffic is an index to general business conditions, at least so far as bank clearings may be so regarded. This basis of reasoning would lead to the conclusion that the telephone business as a whole suffered a set-back in the past year, but the reports of some companies as to earnings indicate a nearly steady growth. This fact calls forth the statement that unusually vigorous canvassing for business, the development of a large amount of new territory, important changes in rates or service, retrenchment in operating force and the deferring of maintenance or reconstruction until more prosperous times, are necessarily important factors in such a comparison when they occur in the period under consideration or a short time prior to it. A company recently organized in a territory poorly developed, if at all, would expect a very rapid growth in normal times, and during such a period as the past year would expect, not a reduction in business, but a reduced rate of increase. It is, moreover, a great testimonial to the soundness of the basic conditions throughout the country that some of these companies can show an increase in business at the present time. On the other hand, it should not be overlooked that some companies have shown increased net earnings on a reduced volume of traffic, by reason of vigorous retrenchment in the business management. Considering any territory which was fairly well developed a year ago and had not been growing at an abnormal rate, the writer believes it to be a sound theory that the telephone business has suffered the same general setback which was experienced in the demand for other public necessities.

If it be accepted as true that telephone traffic is a safe index of general business conditions, and the writer believes that the reasons for so accepting it are generally sound, the corollary to that proposition is instructive and important. It follows that with equally favorable conditions as to financing and management, the telephone business is as safe an investment as any other public service or quasi-public corporation serving the public. It follows, too, that the public demand for telephone service can be reasonably anticipated and predetermined; that it will be as stable as the demand for electric light, gas, water, transportation, etc. Much has been said and written about the value of telephone securities; a great deal of it has been in the form of attack by one of the two groups of interests engaged in the business, the Bell and the independent companies, upon the securities of the other. The Bell companies have charged the independents with making rates too low to provide for proper maintenance and reconstruction and give good service at a profit; the independent have charged the Bell companies with overcapitalization and extravagance. Specific instances can without doubt be quoted to support the contentions of both sides; it would be unreasonable almost to expect that such would not be the case in any business of such vast magnitude at the present time. The essential point to be given prominence is that with sound



Relative Values of Bank Clearings and Telephone Traffic.

financing, good engineering and economical management, good service can be given at fair rates that will earn a fair return upon the investment; the demand for service is stable and, therefore, the field should have the confidence of the investor.

The independent interests defended themselves admirably from the last attack upon their financial credit by stating that in the last five years less than 1 per cent of their companies have failed or temporarily suspended dividends. From the investor's point of view, a strong reason for withholding his confidence in the safety of telephone securities is the campaign of villification and abuse which has so long been waged between the two principal groups of interests in the business. Competition in the telephone industry has unquestionably brought about advantages to the public that could have been secured in no other way, but competition becomes harmful when it departs from honorable methods and seeks to secure business upon any basis other than merit and good service and fair rates. It is to be hoped that the day is not distant when the telephone branch of the electrical art will be dignified by business methods similar to those which now obtain in other branches, to the permanent good of telephone securities as an investment.—*Electrical World.*

The Development of Telephony

By Sergius P. Grace

THE transmission of intelligence by the telegraph had, by the middle of the last century, reached a fair state of development, and it was but natural that the inventors of telegraphic apparatus should turn their attention to the creation of telegraphs which would not require skilled operators. This was accomplished in the early 70's by the invention of the printing telegraph

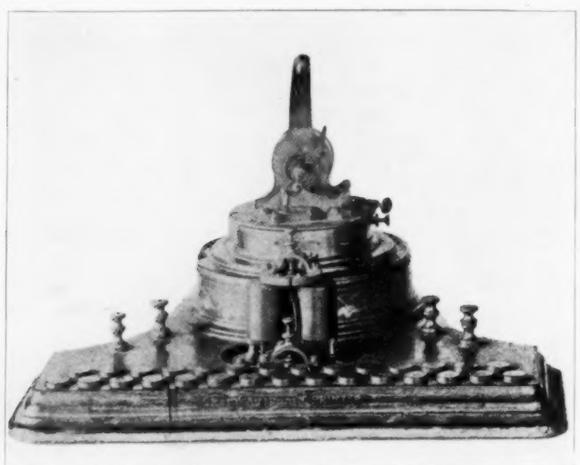


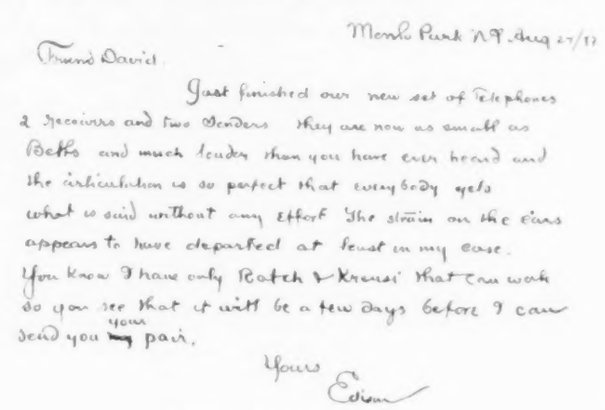
Fig. 1. First Gray Printing Telegraph.

whose step by step mechanism would reproduce at the receiving end of the line any character or letter struck at the transmitting end. One of the earliest successful types of printing telegraph was invented by Elisha Gray. Scientists and laymen alike had dreamed of the long distance transmission of articulate speech, but its accomplishment seemed so far in the future that when the printing telegraph was developed it was hailed as one of the great inventions of the century, and it was predicted that it would have a most profound influence upon the business and social relations of the country.

As far back as 1874 the city of Pittsburgh was supplied with a printing telegraph system, making use of the Gray printers. Many of the iron and steel companies had printers in their offices, connected to a central exchange located on Fifth avenue in the First National Bank building. These printers were operated by the Central District and Printing Telegraph Company, the "central district" part of the name referring to the messenger branch of the business. In Fig. 1 is shown the first Gray printing telegraph ever used in the city of Pittsburgh.

When in the memorable year of 1875, Alexander Graham Bell gave to the waiting world the masterpiece invention of the century, the electric telephone, there were many who considered it only a scientific toy; but the discerning ones saw that properly developed it was going to be the greatest labor saving invention of the ages. Among the latter was T. B. A. David, the president of the Central District and Printing Telegraph Company. In the fall of 1876 he investigated the electric telephone system of Bell, and shortly afterwards he witnessed a trial of a Bell telephone receiver in combination with the recently invented carbon transmitter of Thomas A. Edison. Mr. David, with his broad mind, instantly say the possibilities of the telephone and determined that Pittsburgh should be one of the first cities in the country to exploit this invention. Having control of the lines of the printing telegraph company he was in a good position to introduce the telephone. In the summer of 1877 Thomas A. Edison agreed to make for Mr. David two telephones for exhibition purposes in Pittsburgh. There were delays in the manufacture of these instruments because of the limited machinery and material at Mr. Edison's disposal, and several letters were written by Mr. Edison to Mr. David explaining the delay and asking him to keep up his courage. These letters were recently taken from an old file of the Central District and Printing Telegraph Company, and they throw an interesting side light on the development of telephony in the days when the carbon transmitter was being born. Mr. Edison has always had the reputation of being a hard worker, and this is borne out by his statement in one of the letters that he and his assistants were working 22 hours per day. In another letter he asks Mr. David not to be too critical regarding the first two telephones, for he had to make them with some old pieces of hard rubber and a pair of pliers. One of these letters is reproduced in Fig. 2.

The telephone exchange established by Mr. David represented the Western Union Telegraph Company, who at that time was fighting the National Bell Telephone Company for control of the telephone field. The Bell company also established an exchange in Pittsburgh, but in the year of 1880, at the close of the famous litigation between these rival companies, the two exchanges in Pittsburgh were consolidated. However, the old name of



Menlo Park N.J. Aug 27/77

Friend David.

Just finished our new set of Telephones 2 receivers and two Senders. They are now as small as Bells and much louder than you have ever heard and the articulation is so perfect that everybody gets what is said without any effort. The strain on the ears appears to have departed at least in my case. You know I have only Batch & Kruesi that can work so you see that it will be a few days before I can send you your pair.

Yours Edison

Fig. 2. An Old Edison Letter.

the Central District and Printing Telegraph Company was retained because of the very favorable charter which it had secured from the state. This explains the peculiar name of one of the largest of the Bell licensee companies, and brings out the fact that originally it was chartered to exploit the printing telegraph.

From 1876 to 1886 the telephone all over the country had a struggle for existence. The telephones were of the crudest type, the switchboards were simply adapta-

tions of telegraph boards, and the vast amount of iron wire strung on roof tops was a combination not productive of a telephone service such as would inspire the confidence of the public. Added to these handicaps the introduction of the electric trolley and electric light and power service made the grounded telephone lines extremely noisy by induction. As an example of the crude switchboards of early days, a switchboard is shown in Fig. 3 which was made by Charles Williams in his old Boston shop in the early 80's. This board was used for a number of years for a private branch exchange in the Dixmont Insane Asylum.

From 1886 to 1896 the various telephone companies, assisted by the engineering departments of the American Bell Telephone Company and the Western Electric Company, made heroic efforts to develop apparatus and lines suitable for the transmission of electrical energy for articulate speech. It was early found that iron wire, because of its high resistance and inductance, seriously retarded telephone speech, but copper wire could not be used because of its low tensile strength. It was not until Thomas B. Doolittle, of the engineering staff of the American Bell Telephone Company, developed the process of hard drawing copper wire that copper could be used at all for outside lines in the development of telegraphy and telephony.

Even with the advent of metallic circuits many troubles were experienced with the telephone lines from external induction from electric light and power wires, making the telephone lines noisy, and from induction caused by neighboring telephone circuits, resulting in the phenomenon called "cross talk." A system of transpositions had to be developed which would keep the lines reasonably free from induction from outside sources and yet which would prevent "cross talk" from one telephone circuit to another. "Cross talk" is overhearing from one circuit to another, the current being induced electro-magnetically and electrostatically without metallic contact.

Because of the larger number of wires required in telephony it became imperative to design a cable which would accommodate in a small space many hundreds of wires. After a long period of development work Mr. Patterson, of the Western Electric Company, finally developed his paper insulated, lead covered, telephone cable, which still remains standard.

The development of switchboard equipment and apparatus was also rapid in this period, and when the multiple magneto switchboard with self-restoring drops was invented it was considered by some that the limit of switchboard improvement had been nearly reached. In the early 90's it was clearly seen by discerning telephone engineers that to meet the demands of service in large cities a faster and more efficient type of central office switchboard must be developed than the old magneto. Furthermore, in the old magneto system, batteries were placed in each telephone for the operation of the transmitter, and an alternating current generator was supplied for throwing the drop at the central office. The maintaining of these thousands of distributed batteries and alternating current generators was a severe burden upon the telephone companies, and unless they were well maintained poor service resulted. In fact, the magneto telephone may be looked upon as a small power house in which there are means for generating single-phase alternating current and direct battery current.

One of the greatest difficulties with the old type boards was the lack of supervisory signals for the guidance of the operators. In the larger cities where it was necessary to trunk calls from one office to another, this was particularly exasperating and annoying. The time consumed by the operators on these trunk connections was expensive and premature disconnections were the rule instead of the exception. To overcome these objections the engineers developed the modern central battery switchboard. This type of board has become the recognized standard of all telephone companies.

A great majority of the people, and in fact many engineers, are unacquainted with the electrical principles made use of in telephony, and do not understand that telephony and electric light and power distribution are similar problems in the transmission of electrical energy. This similarity was clearly brought out a few years ago by Charles Proteus Steinmetz, of the engineering staff of

Fig. 3. An Early Switchboard.

the General Electric Company, in an address delivered before the American Institute of Electrical Engineers, in which he said as follows:

"The problem of transmitting alternating currents leads to two very distinct phenomena and problems, that of transmitting very large powers at very low frequency relatively, at high voltages with the so-called electrical power appliances, and then the transmitting of very small powers at very high frequency at very low voltage. That is telephony. The theoretical aspect of the problem is the same, but they have to be considered entirely different."

In the development of the central battery switchboard there were required the creation of many new types of apparatus. Special types of charging dynamos had to be developed which would charge the storage batteries without introducing noises in the thousands of connected telephones. New types of electric transformers, known as repeating coils, had to be designed which would have a high efficiency for the high frequency cur- hundreds of different types of relays or circuit closing

devices were necessary. In some of the circuits there may be several dozen contacts for the telephone current to pass through. Any one relay falling out of step will interrupt the connection, and yet some subscribers, on very rare occasions, become exasperated with the whole telephone system because one of these many hundreds of relays fails to open its contact at precisely the right moment. And, strange to say, the public nearly always blames the operators, never stopping to think that perhaps a portion of the delicate and elaborate electrical mechanism in the line is at fault.

In the last eight years there has been great development in the methods of outside construction. In the early days telephone lines were naturally modeled after the existing telegraph construction. The large number of circuits required and the different character of the transmitted current has led to special types of construction for telephone work. In the large cities, in congested centers, underground construction is employed, using cables containing as many as 600 pairs of wires, with direct connection to the subscribers' premises by means

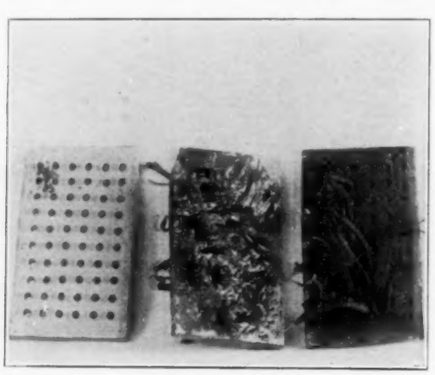


Fig. 4. Porcelain Blocks in Early Conduit Work.

of interior block wiring. Conduits are also built along the main feeder routes to the outside districts, but the distribution is effected at right angles to these feeder routes by neatly designed aerial cables. These cables contain from 50 to 200 pairs of wires and are tapped about every other pole, so that the service wire to the subscriber's premises may be made of minimum length. It is interesting to note that one of the first underground systems for the distribution of telephone wires anywhere in the world was installed in 1882 on Fifth avenue, between Wood street and Liberty avenue. Perforated porcelain blocks were laid on edge in a wooden box and annunciator wire pulled through the holes, after which the box was filled with pitch. These wires gave service for nearly a year, until the insulation finally failed. A photograph of some of the original blocks is shown in Fig. 4.

It had been known for some time that even with very powerful transmitters the range of telephone transmission had a distinct limit, and the increasing of the transmitting power had but little effect in increasing the volume or improving the articulation of the transmitted speech. The telephone current has such a high frequency that the distributed capacity in a long telephone line is very active in attenuating and distorting telephone speech. Remembering that the telephone current alternates from 100 to 2,000 times per second, the difficulty of obtaining a sufficient quantity of electricity at the far end of a long circuit to properly operate the receiving telephone apparatus can easily be appreciated. If we had to deal with the resistance of a telephone circuit alone, and the capacity and self-induction were absent, the current received at the far end would be strictly proportional to the resistance of the circuit; but when distributed capacity is combined with resistance and the self-inductance is very small, the waves of current are rapidly attenuated and besides distorted, for the higher frequencies, corresponding to the over-tones of the human voice, will not be attenuated at the same rate as the lower frequencies, and therefore the received speech will appear unintelligible or distorted to the listener.

Mathematical electricity had pointed out some years ago that the distributed capacity of a telephone circuit might be counteracted by inductance placed in the circuit, but it remained for Doctor Pupin, of Columbia University, to show us how to place self-inductance in a telephone circuit so as to limit the effect of the distributed capacity. These self-inductance coils are known as loading coils and are being used today in thousands of lines of the Bell telephone companies. The placing of these coils in a telephone circuit will increase the range of good telephone transmission over the circuit from three to five times. This invention has been of the greatest importance to telephony and its value cannot be overestimated.

The present central battery switchboards are in reality full of automatic features. When a subscriber takes a receiver from the hook a lamp at central automatically lights; when the operator plugs into the line jack this lamp is automatically extinguished; when the called subscriber answers, a lamp on the keyboard shelf is automatically extinguished, and so on, through a multitude of automatic actions. It is probable that the development of telephone switchboards will be in the direction of still further supplying automatic devices to the present type of switchboard, thus increasing the efficiency and speed of the operator without eliminating the human brain from the connection and without causing the subscriber to do his own operating.

Even in the face of the depression of the past year, the telephone business has shown steady gains, which clearly brings out the fact that the telephone is now in the necessity instead of the luxury class. It may be called the high speed tool of the 20th century which is shaping the business and social relations of the world.

The telephone companies are so industriously weaving their lines over the face of the country that soon it may come to pass that instead of a field of the cloth of gold, as in the time of Frances I., we will have a field of the cloth of copper, each thread of which is playing its part in the binding together of the thoughts, the hopes, the ideals, the fancies, and the ambitions, of the family, the state and the nation.

Perhaps in time to come the telephone lines of today may all be forgotten and Professor Ayrton's picture of the future be fulfilled. "The day will come, when we are all forgotten; when copper wires, gutta percha covers and iron bands are only to be found in museums, that a person who wishes to speak to a friend but does not know where he is, will call with an electrical voice which will be heard only by him who has a similarly tuned electric ear. He will cry, 'Where are you?' and the answer will sound in his ear, 'I am in the depth of a mine, on the summit of the Andes, or on the broad ocean.' Or perhaps no voice will reply, and he will know that his friend is dead." — *Proceedings Engineers' Society Western Pennsylvania. Vol. 24, No. 7.*

How to Read Telephone Circuit Diagrams

By David S. Hulfish

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LESSON III.

THE most common type of telephone bell or ringer consists of a permanently magnetized bar magnet and a pair of electromagnet spools mounted side by side in the magnetic field of the bar magnet; opposite the ends of the electromagnets is hung an armature, suspended at its middle point and carrying a rod and tapper ball. The tapper ball plies between two gongs. A suitable alternating ringing current passed through the two spools of the electromagnets will cause the attraction first of one end of the armature and then of the other, causing the tapper ball to strike the two gongs alternately.

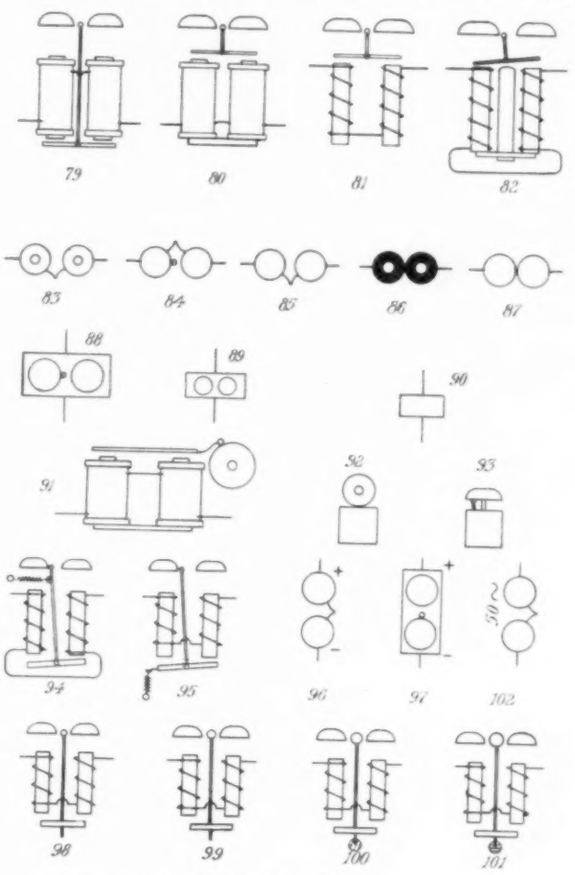
This type of telephone ringer is represented frequently by a picture more or less nearly complete, and therfore easily recognized. Such a representation hardly can be called a "symbol" until it has been reduced in simplicity to Figs. 79, 80, 81 or equivalent. In these three simple pictures the permanent bar magnet is not shown. It is added in Fig. 82, and often forms a part of the ringer symbol.

In Figs. 79, 80 and 81 the convenience of the draftsman makes the armature horizontal, whereas in all polarized ringers of the types shown the armature always will stick to one or the other of the cores, due to the influence of the permanent magnet. Compare this with the horizontal switch hook levers, and the principle of draftsman's convenience will begin to be appreciated. Note the symbol of Fig. 82, wherein the armature is in a position which really is its position of rest. Note the lack of symmetry and judge for yourself whether the horizontal armature is not more acceptable to the eye of the reader because of its symmetry, as well as more acceptable to the workman because of its greater ease in drawing.

An easier view to draw is that wherein the gongs are presented to the observer. This view is taken in the symbols of Figs. 83, 84, 85, 86 and 87. Fig. 83 shows a familiar symbol, in which the large circles may be considered either as the gongs of the ringer or as a representation of the ends or heads of the magnet spools. In Fig. 84 the tapper ball is shown, fixing the circles as gongs. In Fig. 85, which is the most generally used of all ringer symbols, even the detail of tapper ball is omitted, the gongs or spool ends alone being shown. In Fig. 86 the spool heads and core ends are indicated, the spool heads being shown black to indicate insulation and surrounding the smaller circles of the core ends. In Fig. 87 the draftsman seems to have excelled himself in the matter of simplification or ease of drawing. It is too simple to be good, but this objection may be urged principally because it has not been adopted generally. Fig. 85 is the favorite.

A telephone ringer mounted in a box, with gongs and tapper visible upon the top thereof, is typified in Fig. 88. In Fig. 89 the size is reduced and the tapper ball is omitted. In Fig. 90 even the gongs are omitted, and the small square is hardly identifiable as a ringer when taken alone. When found in connection with the other elements of a substation telephone equipment, and particularly when associated with the under contact of a telephone hook switch, or when connected across the line conductors in series with a condenser, the simple symbols of Figs. 87 and 90 are identified as representing ringers just as surely as if drawn in full detail.

In some instances eccentric arrangements of electromagnets associated with gongs or of rectangles representing inclosing boxes and associated with gongs are used to indicate telephone ringers. Typical instances are shown in Figs. 91, 92 and 93. Fig. 92 is substantially the usual symbol for a vibrating bell, such as a door bell, but, inasmuch as such a bell will respond to telephone ringing



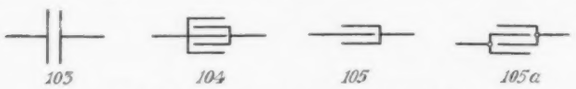
Figs. 79 to 101. Telephone Ringer Diagrams.

currents when the back contact is screwed up too far to permit the contact to break the symbol is not entirely in error.

In selective ringing systems a specialized ringer is used, and this specialization may be indicated in the symbol in some instances.

The biased polarized bell is a common instance of such a ringer. This bell is an ordinary polarized telephone ringer (polarized by the presence of the permanently magnetized bar magnet) with the addition of some modification by which it acquires a "bias" or a tendency always to stick against the same gong of the pair when at rest. This bias may be applied by mounting the ringer

sidewise so that the force of gravity acts in one direction only upon the tapper ball, or it may be applied by a spring upon the armature or upon the tapper rod. See Figs. 94 and 95 for this indication of bias in a ringer. Bias is indicated also by affixing polarity signs to the ringer symbol. Thus, in Figs. 96 and 97 there is indicated a ringer which must have a positive pole of a battery or electric generator applied to its upper terminal to operate the



Figs. 103 to 105a. Condensers Symbolized.

ringer to give a signal, the ringing current flowing downward through the ringer to the remaining terminal and then returning to the battery or generator. A current flowing through the ringer of this symbol in the reverse direction is assumed not to actuate the device.

Another common type of selective ringer is the "harmonic" or "tuned" ringer. In this type of ringer the armature is suspended by a short stiff flat spring or "reed" as it is called. The most noticeable distinction between ringers of this type which are tuned to different frequencies of ringing current is the weighting of the armature, usually accomplished by a difference in the size of the tapper ball. Figs. 98, 99, 100 and 101 show a set of four such ringers. Note the tuning reed projecting from the middle of the armature. This in itself is sufficient to indicate a tuned ringer, and a difference in tuning is indicated by the sizes of the tapper balls. Stationary anchors for the reeds are shown in Figs. 100 and 101. Another device for indicating a tuned ringer and its frequency as well is to note near it the symbol for the frequency of the current which is required to actuate the ringer. Fig. 102 indicates a tuned ringer adjusted to ring in response to a current of 50 cycles per second.

The condenser consists of two plates or surfaces, near each other but not touching each other in conducting contact. Because they are near a charge of electricity upon one of the plates will "induce" a charge upon the other plate, and thus there is attained seemingly the paradox of a current of electricity passing where a conductor does not exist. The amount of current thus passed, however, usually is minute, but in case of alternating currents, where the total current flow is made up of small quantities of current for very short intervals and constantly changing in direction and stopping and starting again, the condenser offers a path through which the total of the small but continually repeated induced charges may amount to a serviceable current. The symbol for the condenser, therefore, may be found in conductors where alternating current is required to pass and where direct current is required not to pass. The symbol may be expected in any ringer circuit, or in any circuit for speech currents. Three symbols for a condenser are commonly used. Fig. 103 represents two condenser plates face to face. Fig. 104 represents a stack of plates in two systems of leaves, each leaf of each system offering both sides to the opposing system, except the outer leaves. Fig. 105 is the reduction to maximum simplicity of the symbol of Fig. 104, and Fig. 105, perhaps, is best of the three. Fig. 105*a* is a symbol recommended by some authorities.

The common method of manufacture for a telephone condenser is to roll together strips of paper and tin foil; the roll thus formed may be pressed flat or used in its cylindrical form. By reason of this method of construction efforts to picture or to symbolize the rolled condenser and to indicate its rolled form are likely to be met. With this knowledge of condenser manufacture such efforts will be recognized at once.

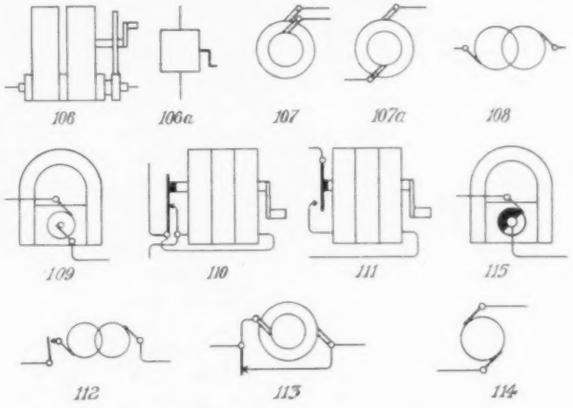
The one distinguishing feature about a hand generator, or "magneto," such as is used upon farm lines and in small exchanges and on toll lines, is the crank. Hence, with any strange looking emblem having an indication of a crank there is great likelihood that it represents a hand generator. See Fig 106*a* as an example.

The hand generator usually is an alternating current device. Figs. 107 and 108 are symbols for alternating current generators, whether hand driven or otherwise. An arbitrary modification of Fig. 107 is shown in Fig. 107*a* In all of these symbols the two collector rings upon the armature shaft are indicated, and also the collector brushes which rest upon the collector rings.

Most hand generators have an automatic switch which at first effort to turn the crank is operated to switch the generator into operative relation to the telephone system, the automatic switch operating again to switch the generator out of the circuits when the crank is released. Such a switch is shown as a part of the symbol in Figs. 110 and 111; in these symbols it may be assumed that the operator must push in upon the crank while turning.

Fig. 106 is a symbol taken from the "Chart for Draftsmen" of the United States Patent Office. This represents a simplified side view of a magneto hand generator without an automatic switch. Fig. 109 shows a simplified end view of a magneto generator for alternating currents. It embodies a combination of the horseshoe magnets of the generator with the symbol of Figs. 107 and 107*a* for the armature details.

In Figs. 112 and 113 the electrical switches shown in connection with the symbols for alternating current



Figs. 106 to 115. Hand Generators Shown Diagramatically.

generators indicate the contacts of the automatic switch forming a part of the hand generator. In the generator symbolized in Fig. 112, the armature circuit is open when the crank is not being turned. In the generator of Fig. 113, the armature is shortcircuited when the crank is not being turned. Symbols 111 and 112 therefore represent generators electrically the same; symbols 110 and 113 also represent generators electrically the same. In the instances of Figs. 110 and 111, the mechanical appearance of each of the devices is catered to, while in Figs 112 and 113 only the electrical functions of the devices are brought to notice.

Fig. 114 is the accepted symbol for a direct-current

generator, whether hand or power driven. It is properly out of place here, but remember that we are learning to read diagrams and are taking things as they are, rather than learning to make diagrams and taking things as they ought to be.

The symbol of Fig. 114 frequently is used carelessly, being somewhat easier to draw than any symbol for alternating current generator, and it is likely to be found representing any kind of a generator anywhere, even a hand generator at a substation telephone.

A "pulsating" magneto generator is typified in Fig. 115. In such a generator, one half of the alternating current is suppressed by making one half of the collecting ring of insulating material, thus converting the collector ring into a commutator. Such a generator gives a current consisting of "pulsations" of current always of the same polarity, or flowing always in the same direction, but with intervals of no current between them where the other half of the alternating current is suppressed. Such a current is not a continuous direct current, but is a current suitable for ringing a biased polarized bell, such as those represented by the symbols of Figs. 94, 95, 96 and 97.

In Fig. 115 the symbol of Fig. 109 is modified to indicate that pulsating current rather than alternating current is generated. The plus and minus signs may be added to indicate the polarity or direction of the pulsations.

Inasmuch as these hand magnetos seldom are continuous or direct current devices, the presence of simple polarity marks near an alternating current symbol would indicate that pulsating current and not alternating current is to be delivered.

Symbols for pulsating magnetoes may be expected in connection with biased polarized ringers, particularly on party lines. Combinations of these elements sometimes are made to permit selective signaling from the substations to the central office, as well as vice versa.

(To be continued.)

Some Questions Answered

By J. C. Kelsey

"I have reached the conclusion that in the telephone business such a thing as 'live and let live' competition is impossible. From my own observation it seems to me that all competition thus far attempted in the telephone business is developing, as speedily as possible, into a 'kill or be killed' affair."—February TELEPHONE ENGINEER.

I certainly do not agree with you. We are nearer "live and let live" competition this very day than ever before. I might practically declare that the dawn of a new day is breaking.

A few years ago, when a frightened Boston management conceived the idea of free service, it looked bad. But the telephone business is so astonishingly good that in spite of fright and foreboding the mother company made money and couldn't help it. Did you ever notice the difference between a man down in his luck and one on the high road of prosperity? One has no courage and jumps at every straw of opportunity. The other, waxing fat, has courage and will give not an inch. The day of free service is gone by and the determination to raise rates extends to both competitive interests.

The telephone management which possesses a gloomy feeling, and feels pessimistic, undoubtedly owes it all to a weak moment when it thought cutting the rate would save an imaginary situation of peril. Today, telephone service is the only cheap commodity. It is ridiculously cheap and I am going to repeat a statement I have often made that the old company, in its wildest hours of self-satisfaction, never charged the American public more than service was worth. Of all the fool statements, the one which dwells upon oppressive rates of the past is the limit.

One of the strongest characteristics of humanity is that they despise cheap things, or those things that come easy. "Come easy, go easy" is as old as the hills. People only prize things which are a little beyond their reach, or cost them something in pain or peril. So nobody admires a telephone company because its service is cheap. When you went to the automobile show, I'll bet you secretly admired the $8,000 machines instead of the $500 ones.

Just why we all seem to think the telephone business is different from all others, I can not explain. The increasing cost of operation per station has some characteristics differing slightly from other lines of activity, but it is not so marked as one usually thinks. "The Pharisee stood and prayed thus with himself—'God, I thank thee that I am not as the rest of men.'" I think sometimes we telephone people are a little pharasaical in our belief, that our business is not like others.

We can thank conditions that limit telephone competition to two systems. Mr. Moulton, of Minneapolis, one of our deepest minds, bases the greatness of the telephone business upon this idea. Consider the railroads. There are seven good roads to Minneapolis from Chicago, and every point that you can name has two or more lines leading to it. With seven railroads to Minneapolis, but one line is in the throes of a receivership. The trouble was and is not due to lack of reasonable business, but the result of finance *a la frenzy*.

From the "kill or be killed" standpoint, look again at the railroad situation. Between Chicago and Minneapolis, the Milwaukee railroad is a hot favorite, and you have to go early to get a berth on the "Pioneer Limited." Between Chicago and Omaha it has a passenger business which, it seems to me, would lose it money. The lesson from this is that a telephone company, with its ramifications, is bound to run into lean and into fat conditions. Where your conditions are fat, your lone competitor is lean, and vice versa.

Another point is the advantage of never having catastrophies to divert the public mind. When a railroad has a smash-up, traffic is diverted in addition to the cost of the wreck. And memories last, too. By some hook or crook a certain railroad running to New York, through Washington, has the reputation of having an awful track and, as well, making it advisable to make your will before taking it. The facts are that this railroad is strictly first-class, its service unsurpassed, and as safe as your own bed—but fool impressions cost this company many empty cars.

But in our own telephone business, we have but one competitor and the terms are equal. If the tele-

phone business deserves a suspicion that it has ceased to be on a "live and let live" basis, and has recently developed into a "kill or be killed" affair, then I am much mistaken.

"Our company is operating nineteen small exchanges and some six hundred pole miles of toll lines. Our plants are all, with one exception, in good shape, having been either newly built or rebuilt within the past few years. Our toll lines are most all new, about half our wire mileage being copper, the other 10 and 12 "BB" galvanized iron.

The question of depreciation has worried us for some time. What, in your opinion, would be a fair charge (annual percentage) for depreciation? Do you not think it is fairer to charge depreciation on the 'units' of the plant—that is, one percentage on aerial cable, another on overhead iron wire, etc?

"And, in the accounting work of such depreciation charges, is it not the accepted plan to continue to charge all cost of construction to your plant account, gradually increasing the same, and to open up a 'depreciation reserve' account, to which the charge for depreciation is credited, and then charged annually, against the earnings of the company?"—E. C. B., Missouri.

The proper depreciation to charge off on any property is that amount which will reasonably take care of changes in the art, and which will keep the property at a value reasonably near a level. This fund is not to be confused with current repair and maintenance accounts, but is an emergency war chest, as it were.

Consider the average man. He is clothed well and keeps comfortable. He eats the best of foods, has the best medical attention and the up-keep of his bodily health is the very best. Yet he has to die. If the man has a son, he will grow up in his place, and the tendency is to preserve the family name, and keep the energies and values of the family on a level, or better.

So the telephone property dies, in spite of current repair. In spite of the best of care the company will be called upon to spend money on general renewals, such as are due to changes in the art, or demands of subscribers.

So far there have been, or we are in the process of going through the second cycle of two periods of practically fourteen years each. In 1898 the second cycle began. This is the common battery cycle. With much fear and dread ,the advocates of the system watched it work out. It had to, and did. After eleven full years of usage, the installations are practically good today and a completion of the fourteen year cycle is easy to predict.

Generally speaking, then, the average annual depreciation of telephone property ranges about seven per cent. But with conscientious up-keep and current repair, the percentage is really smaller. It is nearer four per cent. The average capitalization on such a property as the question describes, including toll lines and telephone exchanges, lies close to $100 per telephone station.

I think the best and simplest way possible is to make a fixed depreciation charge upon your most important unit, the telephone station. Of course, there are other "units" and it might be fairer to the skilled telephone man to divide the units into special depreciation percentages, but the average stockholder can not analyze these conditions, and they are very confusing. But every stockholder has been, at one time, interested in a campaign of subscriber getting. "Watch us grow" has been the slogan of many a company and each day the number upon the bulletin recorded the growth of the number of stations. None was interested in the increase of ducts and cables. Besides, the telephone station is the bread-winner of the telephone family. It is the accredited representattive in each subscriber's family. It is actually a member of the family, and has a place in their affections—this convenient and confidable telephone!

I have always contended that a renewal reserve fund, or depreciation reserve, closely averaged $4 per station a year, or thirty-three and one-third cents per month. I am going to prove this figure by actual illustrations.

As a peddler for a manufacturing company I have attended countless board meetings, considering the question of a general renewal of their system; the old magneto apparatus is worn out—the stockholders, subscribers and directors are tired of it all, and want an entire new system. I have in mind a company which needs $35,000 to put the exchange system on a new common battery basis. Going back over its history, there have been the following telephone years:

1st	year—	100 telephones.
2nd	year—	200 telephones.
3rd	year—	300 telephones.
4th	year—	400 telephones.
5th	year—	600 telephones.
6th	year—	800 telephones.
7th	year—	900 telephones.
8th	year—	1000 telephones.
9th	year—	1100 telephones.
10th	year—	1200 telephones.
11th	year—	1200 telephones.

7800 telephone years.

Multiplying this number of telephone years by $4 we would have $31,200 in the renewal reserve fund. Had this money been on interest, or given credit for interest, there would easily be sufficient money for rebuilding the plant, without making the stockholders go down in their pockets for more money. In real life, the telephone company would use all the money it took, and there should be property which has been built out of earnings which could be capitalized and used. This would then be equivalent to borrowing the reserve money.

But getting back to the $4.00 per station. I have never seen it to fail, that a multiplication of your telephone station years, by the sum of four dollars, will provide all the renewal charges necessary.

The toll line and exchange is but accessory to the telephone station, and a certain territory serving a certain number of telephones generally has the same units as another. Accordingly, all conditions of "units" depreciation can be ignored and the station charge can stand alone. By handling the station account monthly, you are compelled to keep tract of removals and renewals. At a single glance your statement will reveal your exact standing in the subscriber list.

But the best point of all, is the constant reminder to you and subscriber alike, that depreciation costs money, and must be paid for monthly or yearly, by the subscriber. It will do much toward subjecting the kicker who protests your effort to raise rates. You usually ask only a few dollars.

The citizen does not begrudge you the $10 a year or $13 a year for operators and general up-keep, and he does not begrudge you six per cent upon your investment. The irate subscriber and the city council and even the state commissioners are so befuddled over depreciation percentages, that they don't know where they stand. But if it became generally recognized among telephone men, that $4 a year is a fair renewal

charge, it won't bother any exchange management to get away from the $2 and $1 rate curse.

It is that $3, $4 or $6 that the telephone plants need to put them on "easy street." I know of fifty telephone systems operating from 1,000 to 50,000 telephones, which, if $3 per station additional could be collected, would make them absolutely powerful. As it is, they are struggling to keep even. These fifty plants carry on such a desultory depreciation fund, and manage it—or rather mismanage it—in such a mysterious way, that it benefits none.

When you go before governing bodies, such as councils or commissions, the only way you can show your case to any advantage is on the telephone station plan. The whole fight hinges upon depreciation.

So you can open a simple "depreciation reserve" account, to which the charge of depreciation can be credited, and then charged against the earnings of the company. This fact certainly should be borne in mind—that depreciation charges should go against the earnings of the plant, rather than capital stock. There is no activity on earth that should be so reasonably good or remunerative, that gives so much value for so little money, and whose devices wear out so slowly as that of the telephone business.

Supreme Court Upholds Kellogg

By Francis W. Dunbar

THE material facts concerning the Kellogg-Bell litigation and the Kellogg minority stockholders' participation therein are so completely recited in the accompanying decision of the Illinois Supreme Court that little need be added.

It was on or about March 1, 1903, that I first learned that an attempted sale of the Kellogg stock had been made. This information was communicated to me at the instance of Mr. Milo G. Kellogg, and at a time when he had become convinced that he might not succeed in his attempts to buy back his stock. As soon as I was advised of the situation I sought legal advice, and then, believing that Mr. Kellogg's stock had been unlawfully acquired by the American Telephone & Telegraph Company, I decided to bring suit as a minority stockholder for the recovery of the stock to its rightful owners.

In gathering together material for the preparation of the bill, as well as at all later times, I received Mr. Kellogg's hearty co-operation and invaluable assistance.

Shortly before filing the bill, in June, 1903, I advised Mr. Kempster B. Miller, Mr. George L. Burlingame and other minority stockholders of the Kellogg company of the then existing situation and of my intention to bring suit. Up to this time none of the employees of the Kellogg company, save myself, and none of the officers and directors, save those who participated in the attempted sale of the stock, had been advised that the controlling interest of the Kellogg Company had been transferred. Messrs. Miller and Burlingame heartily approved my proposed action, joined me in the suit, and have constantly co-operated with me in our attempt to preserve the rights of independent telephone interests in the long and hard-fought litigation now terminated by the Illinois Supreme Court.

HISTORY OF THE SUIT.

The decision of the Illinois Supreme Court, Friday, Feb. 19, 1909, in the case of Francis W. Dunbar, *et al.* v. The American Telephone & Telegraph Company *et al.* concludes a long and bitterly contested litigation, the result of which is to free the Kellogg Switchboard & Supply Company from the control of the Bell telephone interests and to restore to Mr. Milo G. Kellogg his stock, which the American Telephone & Telegraph Company illegally sought to acquire.

The conditions making possible the transactions which led to the bringing of this suit are briefly as follows:

Mr. Milo G. Kellogg, president of the Kellogg Company and owner of nearly two-thirds of its issued stock, was forced by illness to resign his active management of the Kellogg Company and to depart for California in November, 1901. He resigned his management to the vice-president of the company, Mr. Wallace L. DeWolf, and gave him a power of attorney. This power covered both personal and corporate interests of Mr. Kellogg, and, acting under it Mr. DeWolf, on January 4, 1902, sold to Mr. Enos M. Barton, president of the Western Electric Company, all of Mr. Kellogg's stock, as well as his own and that of others. Mr. Kellogg was not advised of this sale, or attempted sale, until six months thereafter. Upon learning of it, and as soon as his health would permit, he took active steps to recover his stock.

The original bill in this case was filed in June, 1903, by Francis W. Dunbar, Kempster B. Miller, George L. Burlingame and other minority stockholders in the Kellogg company. These stockholders contended that a purchase of a majority of the stock of the Kellogg company by the American Telephone & Telegraph Company tended to suppress competition and create a monopoly and was, therefore, illegal and void. To this the American Telephone & Telegraph Company replied that the bill of the minority stockholders was insufficient to warrant granting the relief prayed for. Upon this sole question, namely, the sufficiency of the bill filed by the minority stockholders, the case was heard in the Circuit Court of Cook County, Illinois, by Judge Mack, who held the bill insufficient. An appeal was then taken to the Branch Appellate Court of the same county, and there Judge Mack's decision was ffirmed. The minority stockholders then appealed to the Supreme Court of Illinois, and this court, in an opinion handed down October 23, 1906, reversed the two lower courts and established as the law of this case that a foreign corporation, such as the American Telephone & Telegraph Company, doing business in Illinois, had no greater powers than a domestic, or Illinois, corporation, and that an alleged purchase by the said American company, either in its own name or in the name of others, of a majority stock holding in a rival company for the purpose of controlling it and thus stifling competition, was illegal and absolutely void—not merely voidable.

The law of the case having thus been once and for all determined by the court of last resort, it remained to prove the allegations of fact contained in the bill. Accordingly, the case was remanded to the Circuit Court

of Cook County and all the proofs were produced before Judge Windes of that court. A number of months were consumed in adducing these proofs. The case was then fully argued before Judge Windes, some three days being devoted to the argument, and in a very able opinion he found the allegations of the minority stockholders' bill substantially proved and, under the law as determined by the Supreme Court, ordered a decree entitling the minority stockholders to all the relief prayed for.

The decree of Judge Windes was entered in February, 1908, and awarded the minority stockholders a permanent injunction, perpetually enjoining the American Telephone & Telegraph Company and its agents from in any manner interfering with the management or control of the Kellogg company. The decree also ordered that the said American company surrender the Kellogg certificates of stock illegally acquired by it to their rightful owners and that the purchase price of said certificates be returned to it. Also, that should the said American company refuse to surrender said certificates they would be canceled and new certificates issued.

The American Telephone & Telegraph Company then carried the case to the Branch Appellate Court, and that court, while finding the alleged facts substantially proven, disagreed with Judge Windes on the relief to be granted to the minority stockholders and rendered an opinion which was a half victory and half defeat.

The minority stockholders then carried the case to the Supreme Court of Illinois, and on Friday, February 19, 1909, the said court reversed the Branch Appellate Court, sustained Judge Windes, and affirmed his decree in its entirety. Mr. Justice Vickers delivered the following opinion of the court:

Francis W. Dunbar and others, minority stockholders of the Kellogg Switchboard & Supply Company (hereinafter called the Kellogg company), filed a bill in equity in the circuit court of Cook county against the American Telephone & Telegraph Company (hereinafter called the American company), the Western Electric Company (hereinafter called the Electric company), the Kellogg Switchboard & Supply Company, Milo G. Kellogg, Wallace L. DeWolf, and others, for the purpose of having a sale of the majority of the stock of the Kellogg Switchboard & Supply Company made by Milo G. Kellogg and others to the American company, set aside and held for naught and for an injunction and other relief. Milo G. Kellogg answered the bill, in which he substantially admitted all its averments, and filed a cross-bill, in which he repeated with some variations and additions, the substantial averments of the original bill, and prayed that the pretended sale of the capital stock held by him in the Kellogg company should be adjudged illegal and void and be cancelled and set aside. Some of defendants below answered both the bill and the cross-bill, while others demurred to both. The demurrers were sustained and the bills both dismissed for want of equity. This decree was affirmed by the Appellate Court, but upon further appeal to this court the decree sustaining the demurrer and dismissing the original bill was reversed, while the decree dismissing the cross-bill on demurrer was affirmed. This court remanded the cause to the circuit court, with directions to proceed in conformity with the views of this court expressed in its opinion. Our former opinion is reported as *Dunbar* v. *American Telephone & Telegraph Company*, 224 Ill., 9.

Upon the reinstatement of the cause in the circuit court most of the defendants who had not already filed answers, answered the bill. Those not answering were either mere formal parties, or parties whose interests were represented and protected by the answers filed. After the issues were made up the cause was heard in the circuit court, the Hon. Thomas G. Windes presiding, upon oral evidence taken in open court, except certain portions of the testimony which was submitted in depositions. The findings of the circuit court were that the allegations of the bill were substantially true and by its decree the purchase of the stock of the Kellogg company by the American company was declared void and of no effect and the relief granted was such as to court deemed equitable, proceeding upon the assumption that the title to the stock of the Kellogg company had never passed out of the persons who made the alleged sales to the American company. The scope of the decree of the circuit court, both in its findings and its equity-adjusting features, will be more specifically stated hereinafter. Upon a writ of error being sued out of the Appellate Court, that court, while agreeing in the main with the circuit court in its findings, disagreed with the relief granted, and accordingly reversed the decree and remanded the cause to the circuit court, with directions to enter a decree in accordance with the specific direction expressed in the opinion of the Appellate Court. The complainants in the original bill have appealed to this court, and here insist upon a reversal of the Appellate Court and all affirmance of the circuit court. Milo G. Kellogg has assigned cross-errors, as have also the American company and Enos M. Barton. The cross-errors assigned by Kellogg do not materially differ from the errors assigned by appellants, while the cross-errors assigned by the American company and Barton bring in question the decree of the circuit court.

Upon the former hearing of this cause in this court the substance of the bill filed by appellants was set out in the statement preceding the opinion. Since the American company and others question by cross-errors the sufficiency of the evidence to support appellants' bill, it will be necessary to re-state the essential features of the bill upon which the cause was finally heard.

Appellants allege in their amended and supplementary bills that the Kellogg company was an Illinois corporation, organized for the purpose of manufacturing, selling, hiring, leasing, or otherwise procuring, owning and disposing of electric telephone and telegraph instruments of all kinds; that the capital stock consisted of 5,000 shares of $100 each; that Wallace L. DeWolf was the president, E. H. Brush, the vice-president and Leroy D. Kellogg the secretary and treasurer of the company; that upon its organization Milo G. Kellogg became the principal stockholder, owning about two-thirds of the capital stock. It is further alleged that the American company was a corporation organized under the laws of New York, and was doing business in this state and most of the other states of the Union; that said last named company had become the owner of the business and stock of the American Bell Telephone Company of Boston, and that F. P. Fish was its president; that the American company was the owner of a large amount of stock of numerous licensee or subsidiary telephone companies and operated a large system of telephone and telegraph lines in the United States; that said American company owned a majority of the capital stock of the Electric company; that said corporation and the Electric company formed what is known as the "Bell Telephone Monopoly," which for many years had exclusive control of the business in the United States as to the use of both telephone and telegraph apparatus, due to the numerous patents owned and controlled by said American company; that the president of the American company is also a director of the Electric company; that the Electric company is an Illinois corporation, engaged in the manufacturing, buying and selling of electric apparatus used in the construction, operation and maintenance of telephone and telegraph systems; that E. M. Barton is president of said Electric company, and that he is dominated by Fish and the American company through the latter's control of the board of directors of said Electric company.

It is further alleged in the bill that telephones, switchboards and instruments and other apparatus of the independent telephone companies throughout the United States have been manufactured by a number of companies, the most important of which are the Kellogg company and the Stromberg-Carlson company, both of which are located in Chicago, and each of which exceeds in capacity the business of any other telephone manufacturing company in the United States except the Electric company; that the business of the Kellogg company exceeded that of the said Stromberg-Carlson company in supplying switchboards and other apparatus for the larger independent exchanges throughout the country; that in consequence of the condition and circumstances thus stated, it is charged in the bill that in order to stifle competition and create a monopoly in itself and its licensee companies and to enable them to exact unreasonable and excessive rates and charges, the American company conceived the illegal purpose of acquiring at least two-thirds of the stock of the Kellogg company, and through said ownership to elect and maintain a board of directors which should not act in the real interest of the Kellogg company but in the interest of and subservient to the interest of the American company, and thereby free that company and its licensees from the competition of the Kellogg company and independent exchanges. The bill charges, on information and belief, the method that said American company contemplated adopting to accomplish its unlawful purpose.

The bill then sets out the circumstances under which the American company acquired, by purchase from DeWolf, an agent of Milo G. Kellogg, 3,307 shares of the Kellogg company stock, and the acquirement, with like unlawful purpose, of 1,004 shares of stock from other stockholders in the said Kellogg company. The bill charges that these purchases were made by Barton, president of the Electric company; that the money to pay for said stock was furnished by the American company, and that the stockholders of the Kellogg company of whom these shares were purchased by Barton were ignorant of the fact that they were selling to the American company. It is charged that by the contract entered into between DeWolf and Barton in regard to the sale of the Kellogg shares, Barton agreed to pay $45 per share in cash upon the delivery of the certificates, and also to pay, in addition, per share, the proceeds of any and all bills and accounts receivable, due and owing to said Kellogg company on December 1, 1901, amounting to $323,248.09, as the same are paid and collected; that it was also agreed that the business of the Kellogg company should be carried on in the usual manner for the space of one year; that these transactions were all consummated while Milo G. Kellogg was in California on account of ill-health and without his knowledge or personal participation therein, and that as soon as he learned of said sale he heartily disapproved thereof and sought in every way to re-purchase his stock, in order that the Kellogg company might be managed in the interest of its stockholders and not to be used as an instrument to create and perpetuate in the American company a monopoly of the telephone interests; that Barton and Fish, while willing to sell a portion of said stock, insisted upon retaining two-thirds thereof.

The bill further charges a series of acts done by Barton through the officers and agents that had been placed in control of the Kellogg company through the control it had acquired of a majority of the Kellogg company stock, all of which acts are charged to be in furtherance of the illegal purpose of the American company to disorganize and dissolve the Kellogg company. The prayer of the bill was that a temporary injunction might issue, which upon final hearing, should be made perpetual, restraining the American company, Barton, Fish and the Electric company from selling or otherwise disposing of the shares of stock which they held in the Kellogg company, aggregating 4,311 shares, that a meeting of the stockholders be convened, under the direction of the court, for the election of a new board of directors, and that the holders of the stock in question be enjoined from voting in said meeting any of said shares of stock and that the said American company, Barton, Fish, the Electric company, and all of their officers and agents, be enjoined from attempting to dissolve or otherwise interfere with the interest and business of the Kellogg company, and that the sale of the shares of stock in the Kellogg company to the American company be set aside and held for naught.

By a second supplemental bill filed by Francis W. Dunbar, Kempster B. Miller and George L. Burlingame it is charged that in January, 1907, the meeting of the stockholders of the Kellogg company was held in Chicago; that all the stock of said company was represented at the said meeting either by owners or proxies, and that Milo G. Kellogg attended said meeting and nominated for election a board of directors consisting of Dunbar, Miller, Burlingame, Milo G. Kellogg, Leroy D. Kellogg, Edwards and James G. Kellogg, and that one Charles S. Holt nominated the following board of directors: Buckingham, Brush, Hanford, Dommerque, DeWolf, Edwards and Coffeen; that votes were cast for the directors as above named by Milo G. Kellogg 3,405 shares, and by other persons, making a total of 3,736 shares out of 4,970 shares present, and that said board of directors were duly declared elected by Dunbar; that DeWolf,

as president, presided at the said meeting; that Charles S. Holt, counsel for the American company, was present and claimed to be the proxy and owner of 3,305 shares of the 3,405 shares so owned and voted by Milo G. Kellogg in person; that said DeWolf, acting in the interest of the American company and the Electric company, refused to recognize the vote of Milo G. Kellogg in respect to 3,305 shares of stock, and claimed and pretended that the directors so chosen were not elected but that in their place and stead the second set of nominees were elected, and that said second set of directors, other than Edwards, under the direction of the American company, the Electric company and Fish and Barton, have assumed and pretended to be, and have acted as, the directors of said Kellogg company. It is averred that Milo G. Kellogg was the owner of and entitled to vote the 3,305 shares of stock, and that the vote of such stock by Holt was void and of no effect. Said supplemental bill prays that Dunbar, Miller, Burlingame, Milo G. Kellogg, Leroy D. Kellogg, James G. Kellogg and Edwards may be declared elected and to constitute the duly elected board of directors of the Kellogg company, and prays for an injunction against all persons interfering with the exercise of their duties as such board. Subsequently, by amendment and supplemental bill, it was charged that on the 19th day of December, 1906, the Kellogg company declared a dividend of fifty per cent upon all its capital stock, and that said company on that date paid to such American company a dividend amounting to $215,550 upon 4,311 shares of stock of said Kellogg company. The American company denied, by supplemental answer, that it had received a fifty per cent dividend, or a dividend of any per cent or any amount, on any shares of stock of the Kellogg company. A plea was interposed setting up the dismissal of the cross-bill and the affirmance thereof by this court as an adjudication that Milo G. Kellogg was not the owner nor entitled to said shares of stock, and for that reason was not entitled to vote said shares at the stockholders' meeting on January 15, 1907.

The foregoing statement is sufficient to show the general character of the bill. The findings and decree of the circuit court may be summarized as follows: After reciting in detail the averments of the bill and finding the facts substantially as therein charged to be true, and specifically finding that the pretended purchase of 4,311 shares of stock by the American company, in its necessary operation at the time it was made, tended and tends to materially suppress competition and creates in said American company and its licensee companies a monopoly in the rendering of telephone service to the public throughout the United States and in the different cities and other places thereof, and that it was the intention and purpose of said American company, in making each of the pretended purchases of said shares of stock, to so restrict and suppress competition in said telephone service and create in itself a monopoly in said service, and that said attempted purchases of stock by the American company were contrary to the public policy of the State of Illinois and void, the decree finds that no title to said stock passed thereby from any of said sellers to said American company or said Barton, but that, despite said attempted sales, each of said sellers still remains the owner of the shares of stock so attempted to be purchased from him. The decree finds that the American company paid DeWolf, as attorney in fact of Milo G. Kellogg, for the stock obtained from him, $351,229.44, and that the said American company paid to the several owners thereof $114,036.48 for the other shares of stock, being a total of $465,265.92 which the said American company paid for 4,311 shares of stock. The decree finds that on December 19, 1906, the Kellogg company declared a dividend of fifty per cent upon all its capital stock being then under control of the American company, and on that date paid to said American company, and said American company received, the dividend of fifty per cent upon the 4,311 shares of stock which the said American company claimed to own. The dividend paid to the American company on this date was $215,550.

The decree recites the proceedings of the stockholders' meeting in January, 1907, and finds that the set of directors nominated and voted for by Milo G. Kellogg were duly elected directors of the Kellogg company, and that said Kellogg was entitled to be recognized as a stockholder of the Kellogg company, with the right to vote the shares of stock attempted to be sold by DeWolf to the American company, and that the other set of directors, other than Edwards, were not elected directors of the said company. Following these findings the decree of the circuit court ordered, adjudged and decreed that Milo G. Kellogg and the other stockholders of the Kellogg company who had made a pretended sale to the American company are still severally the owners of such shares of stock, aggregating 4,311 shares, and a permanent injunction is granted restraining the Kellogg company, and its agents and officers, from refusing to recognize such parties as stockholders and from rejecting the votes of any of them except in so far as the injunction might be modified, and also from recognizing and treating said American company, or any of its assigns, as the owner or owners of any of the said 4,311 shares of stock; that the temporary injunction heretofore issued against the American company and others be made perpetual. The board of directors declared to have been elected by DeWolf at the January meeting are enjoined perpetually from exercising any of the powers or privileges of directors of said Kellogg company, and from in any way interfering with the conduct or management of the business affairs or the possession or control of the property, books or papers of said Kellogg company, unless hereafter duly elected such directors in said company. DeWolf and Dommerque were perpetually enjoined from acting as president and secretary, respectively, of the Kellogg company.

By the seventh paragraph of the decree it was ordered, adjudged and decreed that the American company, within ten days from the 15th day of February, 1908, deposit with the clerk of the circuit court, duly endorsed in blank or to the order of the clerk of said court, all of the certificates of stock representing or purporting to represent 4,311 shares of stock so attempted to be purchased by said American company, and, if necessary to enable him to make distribution of said shares according to the decree, said clerk is authorized to surrender such certificates and that the Kellogg company should issue in lieu thereof other like certificates of stock, aggregating 4,311 shares.

By the eighth paragraph of the decree it is ordered, adjudged and decreed that within twenty days after said certificates shall have been deposited with said clerk, and any of said sellers to the American company of said stock shall have been served with notice of the deposit of said certificates with said clerk, said seller may deposit with such clerk a certified check upon a Chicago bank, payable to the American company, for the difference between the purchase price paid by theAmerican company for the said stock, plus the interest at the rate of five per cent per annum thereof from the time or times when payment or payments were made to the date of said deposit of said check, and the sum of fifty per cent of the par value of said stock plus interest thereon at five per cent per annum from December 19, 1906, to the date of the deposit of said check, and upon delivery of such certified check to the clerk said clerk shall forthwith deliver to the seller so depositing such check a certificate duly endorsed, for the number of shares so attempted to be sold by said seller to the American company and shall shall deliver said check to the American company. The decree names the several sellers of stock and the number of shades that each is entitled to receive under this clause of the decree.

By paragraph 9 of the decree it is ordered, adjudged and decreed that in the event the said American company shall not, in compliance with this decree, deposit the said certificates for 4,311 shares of stock within ten days from the 15th day of February, 1908, the said certificates of stock for said 4,311 shares shall, each of them be, and the same are, canceled and held for naught, and the Kellogg company is directed to immediately issue and deliver to the clerk of the court new certificates for said 4,311 shares of stock, such certificates to be for the several numbers of shares of stock which will permit the distribution to the several parties as in the decree contemplated, and the several sellers of such stock are permitted to receive the shares to which they are severally entitled by depositing a check for the amount and in the manner provided in paragraphs 8 of the decree, and upon his doing so the clerk shall deliver to such seller such new certificate of stock for the number of shares specified opposite his name in paragraph 8, and said Kellogg company shall have and recover from the American company the sum of $215,550, with interest thereon at the rate of five per cent per annum from December 19, 1906, crediting, however, in reduction of said judgment, all sums received by said American company in respect of dividends or interest thereon which any seller shall have applied, by way of offset, in a settlement for his stock under the provisions of the decree, and in default thereof execution to issue therefor. Any money collected by the Kellogg company on said judgment is to be held by it subject to the further order of the court, and any checks delivered to the clerk by any seller under the provisions of this paragraph shall be turned over and paid to the American company.

Paragraph 10 of the decree makes provision for a public sale by the master in chancery of all or such part of the certificates of stock as should not be accepted and paid for by the sellers thereof in accordance with the preceding provisions of the decree. Out of the proceeds of the sale the master was directed to deduct his commission, and pay for the proceeds of said sale to the American company the difference between the purchase price paid by the said American company to said seller to it, for the shares of stock so sold by the master, plus interest at five per cent on said payments from the date when they were made to the day of sale, and the sum of fifty per cent of the par value of the said stock so sold, plus interest thereon at five per cent from December 19, 1906, to the date of said sale by the master, and if there is a balance remaining in the hands of the master of said proceeds he is directed to pay it to the sellers of the stock. A provision is made in the decree modifying the injunction so as to permit the board of directors elected by the votes of the American company in January, 1907, to continue in the management of the affairs of the Kellogg company until all of the sellers of said stock shall have complied with the provisions of the decree in regard to making a deposit with the clerk to reimburse the American company in accordance with the provisions of paragraphs 8 and 9 of the decree, or until a sale of said stock.

There are some general provisions in the decree intended to regulate the conduct of the affairs of the Kellogg company pending the execution of the decree which are not necessary to be set out, since they are subsidiary in their nature and intended to regulate matters of detail consistently with the general relief granted by the decree.

Upon a review of the foregoing decree by the Appellate Court for the First District the decree of the circuit court was reversed and the cause remanded to the circuit court, with directions to enter a decree in accordance with the views expressed in the opinion of said Appellate Court. The Appellate Court held that the evidence sustained the material averments of the bill, but refused to hold that the purchase of the stock by the American company was void as between the parties to the sale. It held that the sale was void as to the minority stockholders and only voidable as to Kellogg and other sellers. The decree of the circuit court was held to be erroneous in that it recognizes in the minority stockholders the right to have the title to the 4,311 shares of stock determined and adjudged upon their bill, holding that such relief could not be granted under the pleadings in this record. Another point of difference between the circuit and Appellate Courts is in regard to the election of a board of directors at the January meeting, 1907. The Appellate Court held that owing to an irregularity in the manner of voting the shares of Milo G. Kellogg the persons for whom he attempted to vote were not elected, independently of the question as to who had the right to vote said shares, and that therefore DeWolf, Hanford and Buckingham, who had previously been elected directors prior to this meeting, held over until their successors were duly elected; that eliminating the 4,311 shares of stock from the January meeting there was no quorum and no election, hence the result is reached that the old board is still holding over in office under the by-laws, which provide that the directors shall hold their office until their successors are duly elected. The Appellate Court held that by the alleged sale by DeWolf of the Kellogg stock a title passed which is good until set aside, and that such sale could only be set aside on a bill for that purpose upon equitable terms requiring a return of the purchase money; that the decree dismissing Kellogg's cross-bill was an adjudication that he had no right to the stock. The relief which the opinion of the Appellate Court directs to be given is limited to a perpetual injunction against the American company from voting the stock and from receiving any dividends thereon, and a like injunction against the Kellogg company from permitting such stock to be voted by the American company or anyone representing it, and from paying such American company any dividends upon such stock.

While briefs have been filed in this court on behalf of four parties, it is apparent that there are only two real adversary interests—the American company and those identified with it, on the one hand, and those who are seeking to maintain the integrity and independence of the Kellogg company, on the other. All the parties can readily be located on the one side or the other of this line of division. The American company, its president, Fish, and other officers and agents; the Electric company, its president, Barton, and its other officers and agents; DeWolf and other officers and agents of the Kellogg company, who owe their official relation to it to the American company from its control of the majority of the stock of the Kellogg company, are all identified in interest with the American company; on the other hand, Milo G. Kellogg and others who made the alleged sales of stock to the American company, the minority stockholders who filed the original bill, and the board of directors for which Kellogg cast his votes at the January meeting, in 1907, represent the other side of the controversy. We will consider the several questions arising on this record with this general classification in view.

The first question which requires consideration arises on the cross-errors assigned by the American company, which call in question the findings of the circuit court that the tendency of the stock purchase by the American company was to suppress competition and that such purchase was made for such unlawful purpose. This question involves the right of appellants to any relief whatever. If appellees' contention is sustained upon this point it would necessarily follow that the judgment of the Appellate Court and the decree of the circuit court should both be revised and the cause remanded to the circuit court, with directions to that court to dismiss appellants' bills.

A preliminary question is presented as to the degree of proof required to establish the charges in the bill. On behalf of the American company and Barton it is contended that the bill charges them with a criminal offense, in that the bill, in effect, charges a violation of sections 1 to 4 of the Anti-trust law of 1891 and sections 1 to 6 of the Anti-trust act of 1893, both of which acts are found in chapter 38, sections 269a to 269t, Hurd's Revised Statutes of 1905. Without deciding what the rule as to quantity of evidence would be if a violation of the Anti-trust laws were charged in the bill, it is sufficient to say that the law of 1893 has been held unconstitutional by the Supreme Court of the United States in Connolly v. Union Sewer Pipe Co., 184 U. S. 540; and that as to the act of 1891, it is leveled against creating, entering into or becoming a party to any pool, trust, agreement or combination to fix or limit the amount or quantity of any article of merchandise or fix the price or lessen the production and sale of any such article, which offenses are not charged in the bill either by direct averment or necessary implication. The charge in the bill is that the purpose and tendency of the purchase of the stock in question by the American company were to stifle competition, and the purchase was therefore illegal and void because contrary to the public policy of this state. Whether any of the provisions of the Anti-trust act were violated by any of the parties to the transaction involved in this suit is not necessary for us to now discuss or determine. It is a sufficient answer to this contention that such violation is not charged in the pleadings, nor is it necessary to prove such offense to maintain the action or defense set up in these pleadings. It is not necessary that the proof should exclude every reasonable doubt of the truth of the averments of the bill to justify a decree in favor of appellants. Does the evidence sustain the averments of the bill upon the truth of which the unlawful character of the stock purchases depend? The evidence in this record which is largely directed to a solution of this question is very voluminous. It would not be practicable within any reasonable limits of an opinion to discuss it in detail. In the bill of appellants, as the same was presented upon the former hearing in this court and as the same stood, with some slight amendments and additions, when the cause was heard, the facts relied upon to establish the unlawful purpose and tendency of the stock purchases were set out in detail, as will appear from the summary of those averments already set out in this opinion.

The proof shows that the American company and the Kellogg company were competitors in business, and that their fields of operation extended not only throughout the United States, but to foreign countries as well. That the American company regarded the so-called independent exchanges throughout the country as offering the most serious obstacle in the way of its complete monopoly of the telephone business in the United States cannot, under the evidence in this record, be denied. The Kellogg company manufactured multiple switchboards and other telephone apparatus and supplies and sold its products to the independent exchanges throughout the country. The interest, therefore, of the Kellogg company was identified with the independent exchanges, since they were the only customers for its products. It is shown that Milo G. Kellogg was an expert in telephony and a successful inventor of many new and valuable appliances in the telephone business. Patents for these appliances were owned and controlled by the Kellogg company and contributed much to the success both of the Kellogg company and the independent exchanges which bought and used them. The evidence shows that the independent exchanges, to the number of seven thousand, maintained friendly relations with each other through a central organization, which holds annual conventions for the purpose of discussing questions of mutual interest and with a view of advancing the interests of the independent exchanges in their rivalry and competition with the American company and its subsidiary exchanges. It is also shown that the American company controlled its licensee companies through the ownership of a majority of stock of the local Bell telephone companies, and that the local Bell telephone companies obtained their equipment entirely through the Electric company, which the American company also controlled through the ownership of a majority of the capital stock of the Electric company. Thus the profits of the American company depended upon the number and success of its subsidiary companies. The Electric company manufactured only for the subsidiary American companies. The independent companies were compelled to procure their apparatus and equipment from independent manufacturers, the principal one of which was the Kellogg company. Continuance in business of the independent exchanges throughout the country depended upon the continued existence of the independent manufacturers of whom they could procure equipment. If the independent manufacturers should go out of business or pass under the control of the American company the independent exchanges would be reduced to the alternative of going out of business or becoming subsidiary to the American company. In addition to selling equipment to independent companies, the Kellogg company and other independent manufacturers would promote and finance the independent exchanges by furnishing money for construction purposes and taking pay in securities. This feature of the independent manufacturers was a source of no little concern to the American company.

The evidence shows that in November, 1901, Milo G. Kellogg, being much alarmed about his health, hastily placed the affairs of the Kellogg company in the hands fo his brother-in-law, Wallace L. DeWolf, and on or about the 23d day of that month went to California, where he remained until the latter part of the following summer. The Kellogg company, and Milo G. Kellogg personally, had become liable, as endorsers, for a large amount of paper made by the Everett-Moore syndicate, and in anticipation that it would be necessary to raise money to meet these liabilities and other accruing bills of the Kellogg company, Milo G. Kellogg gave DeWolf a general power of attorney to sell or hypothecate all the shares of stock in the Kellogg company which were the individual property of Milo G. Kellogg. The evidence shows that soon after the departure of Kellogg for California DeWolf entered into negotiations with Barton for the sale of a controlling interest in the Kellogg company. After one or two interviews between Barton and DeWolf, Barton went to New York and had a conference with Fish, the president of the American company. The result of this interview was that Barton returned to Chicago with full authority from Fish to purchase a controlling interest in the Kellogg company. The contract of sale was entered into between Barton and DeWolf on January 4, 1902. The money to pay for this stock was forwarded by Fish to Barton and by him delivered to DeWolf. The stock was assigned to Barton, although he was not the real purchaser, and so far as the record shows, had no personal interest in the transaction. It was understood and agreed between Barton and DeWolf that the transaction should be kept secret. DeWolf did not inform Milo G. Kellogg of the sale until the 4th day of July, 1902. DeWolf testifies that Kellogg was a very sick man, and that he told Barton that he had gone to California and that he doubted whether he would "ever recover." DeWolf was continued in charge of the Kellogg Company, but after the sale of this stock he consulted with Barton with reference to its affairs. On July 4, 1902, DeWolf met Milo G. Kellogg in Denver, Colo., and then for the first time told Kellogg about the sale of the stock to Barton. The evidence shows that Kellogg heartily disapproved of the course that had been taken. He entered into negotiations for the purpose of buying this stock back, but Fish and Barton refused to sell him the stock, although he offered a profit of $25 per share. In the contract that was entered into between Barton and DeWolf it was stipulated that the Kellogg company should be run for one year as it had been theretofore. It was also provided in the contract that Barton should purchase any other shares of stock that might be offered, upon the same terms he had contracted for the Kellogg stock, and under this clause the purchase of the other shares followed.

The purpose and intent of DeWolf in making this sale is not of

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controlling importance. Whatever his purpose may have been does not assist us in determining the buyer's purpose. It may be that DeWolf's purpose was to relieve the financial situation of the Kellogg company, which seems to have been greatly exaggerated in his estimation. At all events he makes this excuse for himself, and we are disposed to take a charitable view and accord him the benefit of his own explanation. It is certain that neither Fish nor Barton was actuated by sympathy for any real or imaginary financial distress that surrounded the Kellogg company. The reasonable inference from the evidence in this record is, that if Barton and Fish had been sure that the Kellogg company was on the brink of financial ruin they would not have invested in this stock, but would have trusted to the desired end working itself out through the downfall and failure of the Kellogg company. We cannot conceive of the American company rushing in to aid a rival in business by investing nearly a half million dollars in the stock of a company of doubtful solvency. What, then, must have been the purpose of this purchase?

In answer to this question three possible motives may be suggested: (1) The purpose may have been to acquire additional manufacturing facilities; or (2) to invest idle funds of the American company in stocks which would make a fair return upon the money; or it may have been (3) to advance the interests of the American company by lessening the competition of the independent exchanges which were being supplied with apparatus and financial aid by the Kellogg company. Let us inquire, in the light of this testimony, which of these motives actuated the American company in making this purchase.

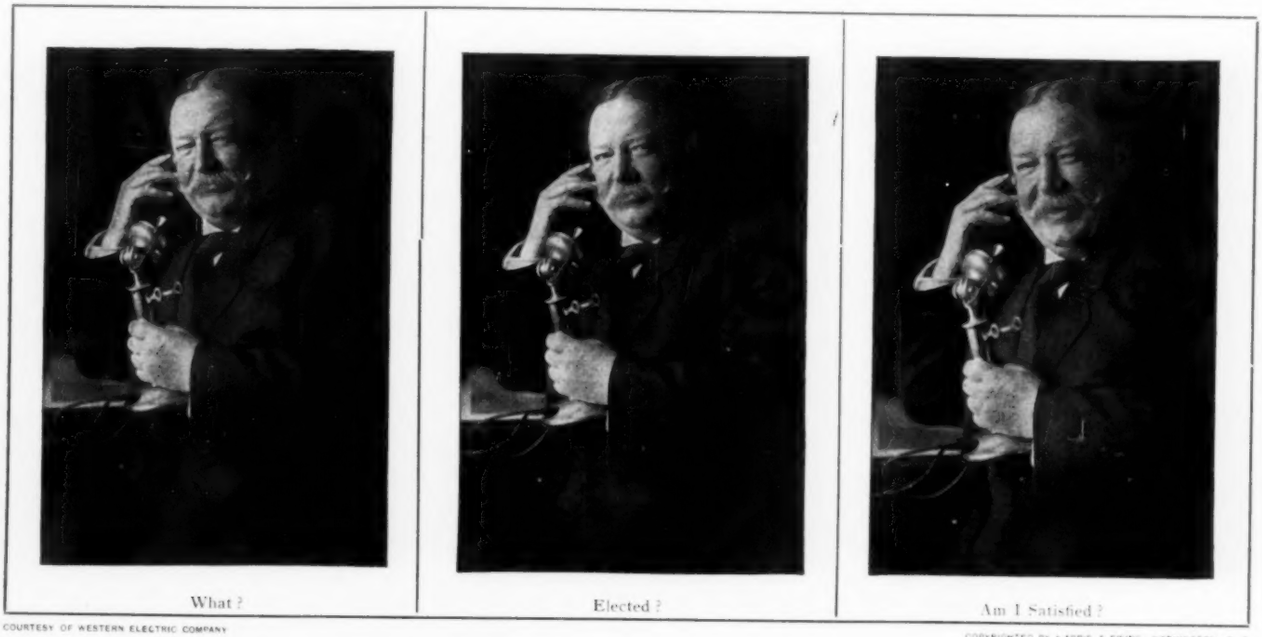
Mr. Fish, in his testimony given in a case against the American company in New York, which was a proceeding to set aside a contract by which the American company obtained control of the Stromberg-Carlson company, another independent manufacturing concern, testified as follows: "The question that was troubling me was not as to the value of the Stromberg-Carlson company's plant to anyone who wanted a telephone manufacturing company. We did not want a telepohne manufacturing company, because we had one of our own. We have had trouble in supplying all the wants of our companies through our present sources of manufacture, but it was a trouble we could meet by the developments of our own factory." He testifies that the Electric company turned out last year a product of $69,000,000, and these additional companies, being so small in comparison with the Electric company, would not weigh in the balance. The first motive suggested must be eliminated as entirely without the range of reasonable probability.

Was this stock purchase made as a legitimate investment of surplus funds by the American company? To this question a negative answer must be given for the following reasons: (1) The American company is not an investing company, except in the stock of its subsidiary companies. Mr. Fish says in his testimony: "I couldn't tell you what percentage of this capital is invested in the stocks of these sub-companies. It is a very large per cent. Besides this, something over $35,000,000, if I recollect aright, is invested in the long distance lines. Of course, the company has real estate, and also, of course, a large investment in the telephones that are leased to these sub-companies. Those are the substantial items. I don't recall any of large magnitude outside of that. To no substantial extent that I remember has it been an investor in other stocks than stocks of companies connected with the telephone service. It has to a negligible extent—to no large extent, that I recall—all its investments of stock have been in these telephone companies, largely for the purpose of developing those companies. In the very old days there was undoubtedly a period when the company bought stock for the purpose of bringing them into the sphere, but it is many years since there has been any change in the relations, and since my time it has been substantially all for the purpose of developing the business of the companies whose stock was already held, and this stock buying has substantially been along that line." (2) The evidence does not show that the American company had any surplus money to invest. At the time this stock was purchased the American company was contemplating the issuance of $30,000,000 of its bonds, and within a few months after this stock was purchased these bonds were issued and sold, together with issues of its stock for the purpose of raising funds to extend its businesses. (3) If the American company bought this stock as an investment, why refuse to sell it to Kellogg when, within a few months after the purchase, he offered it a profit of $25 per share? This offer was refused when this litigation was threatened, and if the purchase had been made for the purpose of an investment, it is reasonable to conclude that the American company would have preferred a large profit rather than to imperil the whole investment in uncertain and vexatious litigation.

Eliminating from consideration the possible motives already suggested and considered, we are brought to the conclusion that the only conceivable purpose the American company had in making this purchase was to decrease to the minimum the competition of the independent exchanges, the existence and success of which were due in a large degree to the Kellogg company. Is there any evidence to justify this inference aside from that by which all other rational motives are eliminated?

Mr. Fish says in his testimony: "The Kellogg company and the other manufacturers for the so-called independent companies were in the habit, and are to-day, of financing them—that is, carrying the large indebtedness and taking pay in securities. * * * I have no doubt that in the course of the discussion (with his executive committee) I made reference to that fact, for I had frequently considered it with the executive comittee before, and probably did say that with the Kellogg company run strictly as a business concern it would no longer jeopardize its own interests and hurt us by unduly financing the independent telephone companies. * * * If I said anything at all and I don't remember that I did say it, although I have often said the same thing to the members of the executive committee—it was that if this arrangement were made the Kellogg company would no longer give extended credits to customers like the Everett-Moore syndicate, that were enabled to develop at the expense of the manufacturing companies from whom they bought their supplies, and to the small extent that the Kellogg company was in the field as a promoting company that was an element to be taken into account. * * * The only way in which our companies were injured by the financing by the manufacturing companies of independent telephone companies was not the competition that those independent companies, when financed, created in our field, but the kind of competition, which was one based upon absolutely false ideas of cost and rates that were and have been found to be impossible. * * * and when I speak of the injury to my companies, what I mean is, the plain proposition that there was an illegitimate business developed at the expense of the manufacturing companies." Again he says: "I have no doubt that we should have used our interest in the Kellogg company exactly as we used our interest in the Western Electric company, or any other interest—to benefit our organization as a whole." Again, he testifies that it "was an advantageous investment for us to make of a small amount of money in view of our general interests." By "advantageous" he explained: "I mean advantageous pecuniarily to the American Telephone & Telegraph Company and its stockholders. The ultimate motive is everywhere and always the advantage of the American Telephone & Telegraph Company and its stockholders." He testifies that in some instances his company has incidentally fostered and advanced independent telephone companies, "and in some of them we have done it knowing what we were about," but he distinctly takes this transaction out of that class by saying: "I don't think in this we fostered or undertook to fostor or advance independent interests." Again he says: "We had no purpose to save the Kellogg company from a collapse out of consideration for the independent interests." Again Mr. Fish says in his testimony: "These transactions of which you are inquiring were taken with the end in view of working out the telephone situation as well as we could. If it were practicable to work it out so as to eliminate the competition in the same territory, that would be clearly for everyone's interest, and it would have undoubtedly worked out in that way. It was our thought that by making this purchase we could get rid of this ruinous competition in the end, and be of substantial benefit not only to our company, but to the competitors to our company and the public."

In view of these admissions of the president of the American company the conclusion is irresistible that the purchase of the stock of the Kellogg company was made with the purpose and intent on the part of the American company to ultimately destroy, as far as possible, the



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competition of the independent exchanges w[illegible] were being financed and furnished equipment by the Kellogg company. [illegible]at it was contemplated that ultimately there should be an increase in the rates charged the public for telephone service as fast as the independent exchanges could be put out of business and the American subsidiary companies installed in their stead is virtually admitted by Mr. Fish in his testimony, both in respect to the Kellogg purchases as well as in his evidence in regard to the Stromberg-Carlson deal in New York. Mr. Fish's contention is that the independent companies were furnishing service to the public from 30 per cent to 35 per cent cheaper than it should be. He testified that in his opinion the so-called independent companies did not figure a sufficient sum for renewal of worn out equipment, and by thus disregarding this important factor in the telephone business the independent exchanges were engaged in "ruinous" competition. Mr. Fish also testifies that "the American company is a divident-paying company. Its object is to make dividends as large as possible." While he does not say so, it is not impossible that the desire "to make dividends as large as possible" may also be a factor which has much to do with the price which Mr. Fish thinks any well regulated telephone company ought to charge the public for telephone service.

The evidence is entirely satisfactory in this record that this stock was purchased with the intent and purpose charged in the bill, and at the time it was contemplated that the Kellogg company would cease business if the original plan and purpose had been carried out. Mr. Fish admits that he and Barton discussed the probable loss that would result from winding up the affairs of the Kellogg company, and that it was estimated that the loss would not exceed $100,000. That the original purpose was to wind up the affairs of the Kellogg company is manifest from a clause in the contract entered into between DeWolf and Barton, by which it was agreed that there should be a distribution of the proceeds of bills and accounts receivable to the selling stockholders. This clearly contemplated the liquidation of the Kellogg company. This clause of the contract was commented on by this court on the former hearing on page 23, as follows: "The averment of the bill to the effect that it is the purpose of the American company to suppress competition and create in itself a monopoly is further aided by the averment that Barton, through whom the purchase was made, agreed to pay, as part of the purchase price, so much per share in cash and the balance by applying thereto the pro rata proceeds of any or all bills and accounts reasonably due and owing to the Kellogg company on December 1, 1901, the same to be settled and paid to said seller as the same are paid and collected by said company, plainly indicating that a dissolution of the Kellogg company was contemplated, because in no other event could the American company appropriate the assets of the Kellogg company to pay a stockholder of that company for the stock purchased by the former company from him; also, that by the contract of purchase the Kellogg company should be carried on in the usual manner for the space of one year in order that bills and accounts receivable could be collected in the usual course of business, thus showing a purpose to dissolve the Kellogg company after the expiration of one year."

If further evidence were necessary to fix upon the American company the unlawful purpose of eliminating competition in the purchase of this stock, the fact might be pointed out that about the time this purchase of stock in the Kellogg company occurred, Mr. Epps called on Mr. Stromberg and said that he "represented one of the largest stockholders in the Kellogg company" and wanted to buy a controlling interest in the Stromberg-Carlson company. Mr. Stromberg refused to entertain a proposition to sell. Epps was sent to Stromberg by DeWolf, who admits that he had talked with Barton about it, and Barton does not deny his participation in this transaction. The evidence shows that afterwards the Stromberg-Carlson company's plant was removed to Rochester, New York, where it continued to manufacture equipment for the independent telephone companies, and that afterwards the American company again attempted to buy the Stromberg-Carlson company's plant by purchasing the control of another company which owned a majority of the stock of the Stromberg-Carlson company. This transaction resulted in a suit by the Attorney General of New York, which caused the abandonment of the proposed purchase. If a controlling interest in these two large independent manufacturing companies could have been obtained by the American company it would have seriously crippled independent exchanges throughout the country.

Again, the evidence shows that the American company, almost immediately after the purchase of the Kellogg stock, made an attempt to get control of $275,000 of notes of the Everett-Moore syndicate. Everett and Moore were promoters. They had behind them a syndicate which had built a large number of street railways and telephone plants in Ohio, Illinois and elsewhere. About the time of the purchase of the Kellogg stock the Everett-Moore syndicate became temporarily embarrassed financially, and it was at this time and under these circumstances that the American company sought to acquire the notes of the Everett-Moore syndicate. Mr. Fish in his testimony frankly admits the attempt to obtain control of this large amount of indebtedness against a concern which was giving aid and assistance in promoting and maintaining independent telephone exchanges at a time when the Everett-Moore syndicate was temporarily embarrassed, and the reason given by Mr. Fish for desiring to obtain control of these notes is thus explained by Mr. Fish himself: "You are undoubtedly referring to the thing I referred to a short time ago, that some time in the spring there was a suggestion made that we should buy the claims against the Everett-Moore syndicate; and my further impression is that they were claims of Mr. Kellogg's and not of the Kellogg company, and that we should buy those for a substantial discount from their face value, which would give us the claims for adversary purposes, if we chose to use them in that way. By adversary purpose I mean for the purpose of taking such steps against Everett and Moore and the Federal Telephone Company as were to our interest; that we should get such advantage as there should be by coming into the possession of these creditors' claims." This circumstance is mentioned as throwing a sidelight on the general methods of warfare against the independent telephone interests that Mr. Fish and his company sanctioned and employed. There can scarcely be any doubt that the purchase of the stock of the Kellogg company proceeded from the same general purpose which Mr. Fish confesses he had in seeking to obtain the Everett-Moore syndicate notes.

Without attempting to analyze the evidence in detail or further discussing it in general, our conclusion is that the finding of the circuit court that the purpose of the American company in making this purchase, as well as the inevitable tendency of the same, was to lessen competition in the business of furnishing the public with telephone service is abundantly sustained by the proofs. This question of fact being settled, the law applicable thereto was determined by this court upon the former hearing already referred to. It would not be necessary for us to do more than call attention to our previous decision in order to establish the general legal conclusion to be drawn from these facts, were it not that a serious difference of opinion seems to exist as to what this court really did decide on the former hearing. Appellees contend that, conceding the facts to be as found by the circuit court, still the stock purchase was only voidable, and that such contention is consistent with the previous decision of this court in this cause. This view was adopted by the Appellate Court, hence the widely different results reached by that court and the circuit court in the adjustment of the equities of the parties. We do not think there is any uncertainty or ambiguity in the language employed by Mr. Justice Wilkin in rendering the opinion of this court on the former hearing. A careful reading of that opinion will show that the right of the minority stockholders to maintain their bill is placed on two grounds: First, that there was a total want of power in the American company to purchase a controlling interest in a competing Illinois corporation. This question is discussed on pages 26 to 29 of the opinion, and it is there held, as clearly as language can express it, that no title to the stock passed by the alleged sale under the facts averred in the bill and that the "whole transaction is null and void," and that the minority stockholders had a standing in equity to restrain the pretended stockholders of such stock from any participation in the affairs of the company. A second ground upon which this court held that the bill might be maintained by the minority stockholders was, that treating the sale simply as an excessive and wrongful exercise of a power which the American company had, for the purpose of making the Kellogg company subservient to the American company, thereby freeing that company and its licensees from the competition of the Kellogg company and independent exchanges, was such a fraud against the stockholders of the Kellogg company that the plainest principles of equity gave them a right to relief. This view is presented on pages 29 to 32. The discussion of the second ground upon which the bill was maintainable in no way detracts from the force of the decision in regard to the first.

Both the American company and the Kellogg company were engaged in this state in the same general line of business. They were indirectly, if not directly, competitors in the business of supplying the public with telephone service. This business is impressed with the public use. The American company could exercise no power in this state which could not be exercised lawfully by a domestic corporation in the same line of business. The attempt by the American company to purchase a controlling interest in the Kellogg company was unlawful. The word "unlawful," as applied to the purpose and acts of corporations, is not used exclusively in the sense of *malum in se* or *malum prohibitum*. It is often employed to designate powers which corporations are not authorized to exercise or contracts which they are not authorized to make —or, in other words, such acts, powers and contracts as are ultra vires. Neither a foreign nor a domestic corporation can lawfully become a stockholder in another corporation unless such power is expressly given or necessarily implied, and especially is this true where the object is to obtain the control of such other corporation. There is no provision of our general incorporation law authorizing one corporation to purchase and hold shares of stock in other corporations, and there is no implied power to so purchase stock in other corporations except where it is necesary to carry into effect the objects for which such corporation was formed. The purchase of a controlling interest in the Kellogg company by the American company cannot be sustained on the ground of implied power. As a general proposition, all contracts and agreements, of every kind and character, made and entered into by those engaged in an employment or business impressed with a public character, which tend to prevent competition between those engaged in like employment, are opposed to the public policy of this state and are therefore unlawful. All agreements and contracts tending to create monopolies and prevent proper competition are by the common law illegal and void. (People v. Chicago Gas Trust Co., 130 Ill., 268.) The public policy of the state on any question is to be sought for in the constitution and legislation as interpreted and expounded by the courts. Section 22 of article 4 of the constitution of 1870 provides that the General Assembly shall pass no local or special law for "granting to any corporation, association or individual any special or exclusive privilege, immunity or franchise whatever." This is a clear declaration that the public policy of this state is opposed to all exclusive and monopolistic franchises and powers, of whatsoever kind or character. It is also contrary to the public policy of this state to charter a corporation for the purpose of buying and selling real estate. The Connecticut Land Company was a corporation organized under the laws of the State of Connecticut, and by its charter it was authorized to deal in real estate. That corporation invested $500,000 in Illinois land. In the case of Carroll v. City of East St. Louis, 67 Ill., 568, this court held that the Connecticut Land Company had no power to purchase land in this state contrary to the public policy thereof, and that no title passed to said company and that it had no power to pass title to its grantees. This case was an illustration of the application of the doctrine announced by the court on the former hearing of this case, that a contract made in violation of the public policy of this state is utterly void. It logically follows that the attempt of the American company to acquire the control of the Kellogg company is void, and that the contracts entered into in pursuance of this purpose are mere nullities, and that the title to the stock in questoin never passed from the sellers to the American company. This was, in effect, what this court decided on the former hearing.

The next question that requires consideration is whether the Appellate Court erred in its direction to the Circuit Court in respect to the relief to be granted appellants. As already shown, the Appellate Court limits the relief to be granted to an injunction again the American company exercising the rights of a stockholder and from receiving any dividends upon the stock in question. A decree confined to such relief would leave this stock in the hands of the American company, which is inconsistent with the previous decision of this court, wherein it is held that the American company had no corporate power to buy the stock and that the attempt to purchase it was ultra vires. The interests of the minority stockholders could not be as well protected by allowing the American company this stock to be returned to its rightful owners. It is not conceived how it would be practicable to continue the business of the Kellogg company with a controlling interest in its stock tied up by injunction in the hands of an unfriendly competitor. No method of conducting the affairs of the Kellogg company is suggested by the opinion of the Appellate Court, and it may be that that court took the view that was urged upon this court in the oral argument, that the decree which the Appellate Court directed to be entered would, operating from the self-interest of the American company, force it to sell its holdings of Kellogg company stock. This might or might not be the result, but if the American company is allowed to sell this

stock, it will, of course, determine who the purchaser or purchasers will be. A decree entered under the direction of the Appellate court would leave the American company with liberty either to retain the stock or to sell it to any person to whom it saw fit to sell, and the purchasers from the American company would enjoy all the rights, privileges and benefits of stockholders. If the American company should sell this stock to someone who was friendly to the American company, it is not at all improbable that the decree which the Appellate Court directs to be entered would be entirely barren of any substantial relief to the minority stockholders. It seems to us that the only way any substantial and permanent relief can be given to these minority stockholders is to require the American company to surrender its stock to its rightful owners upon equitable terms. This relief the Circuit Court granted, and in our opinion properly so, since nothing short of this will afford the minority stockholders complete relief.

It is contended by appellees that the decree of the circuit court cannot be sustained because it grants affirmative relief to Milo G. Kellogg without a cross-bill being filed by him. When this case was before us on the former hearing it was held that the court below properly sustained a demurer to Kellogg's cross-bill. One of the reasons then given why the decree was affirmed is found on page 32, where this court said: "We think the decree of the circuit court sustaining the demurer to and dismissing the cross-bill is right and should be affirmed. No necessity whatever for that bill is shown. At most, Milo G. Kellogg was a mere nominal party to the original bill. No relief was prayed against him, and if a decree granting the prayer of that bill had been rendered he would have obtaiend all he was in equity entitled to."

The relief which Milo G. Kellogg obtains under the decree of the circuit court is a necessary incident to the complete relief to which the minority stockholders are entitled. As we have already attempted to point out, if a controlling interest in the Kellogg company is left in the hands of the American company, or some friendly ally to whom it might choose to sell, it is apparent that the interest of the minority stockholders would be exposed to all the dangers which led them to file their bill in the first instance. It therefore becomes necessary, in order to fully protect the complaining stockholders, to divest the American company of all advantages it has secured through its unlawful attempt to obtain control of the Kellogg company. When the court grants the minority stockholders adequate relief, it is clear that the relief resulting to Kellogg and other stockholders who sold to the American company is merely incidental to the main relief sought by the bill. A cross-bill is wholly unnecessary. Kellogg answered the original bill, in which he admitted all of the material averments thereof, so that there was no issue as to him to be tried and no relief was prayed against him in the original bill. In Boone v. Clark, 129 Ill., 466, this court held that a cross-bill filed by junior mortgage, was properly dismissed for want of equity. On page 493 this court said: "It is further insisted that at least these appellants were entitled to a decree, under their cross-bill, foreclosing their trust deed as against W. H. Colehour, and the court therefore erred in dismissing the cross-bill. The filing of a cross-bill is not necessary for the preservation of the rights of a junior mortgagee to the same premises, as has been seen; and if appellants desire, they may, under their answer, move the court, and it will be the duty of the chancellor—and which may yet be done in this cause—to preserve their rights, as against Colehour, in any surplus remaining from the sale of the property after the payment of the amount due appellees."

Again, appellees contend that the dismissal of the Kellogg cross-bill for want of equity was an adjudication of all his rights. This contention is answered by the quotation which we have already made from Boone v. Clark, supra. This dismissal of a cross-bill for want of equity, under circumstances rendering the cross-bill unnecessary in order to obtain the relief sought by it, is not an adjudication that the complainant in the cross-bill has no rights in the subject-matter of the litigation. It would be a judicial outrage on the rights of Kellogg to dismiss his cross-bill on the ground that he could obtain all the right he was entitled to under the original bill, and then deny him, upon the hearing of the original bill, such relief as he in equity is clearly entitled to on the ground that his rights had already been adjudicated. Courts of equity were never designed to work out such unconscionable absurdities.

Again, the appellees insist that the decree of the circuit court cannot be sustained for the reason that Kellogg and the other selling stockholders are *in pari delicto* with the American company. To this we cannot assent. In the first place, the unlawful features in this transaction are largely imported into it by reason of the unlawful purpose of the American company. It was the American company that expected to profit by suppressing competition and the creation of a monopoly in this state. There is no evidence that this unlawful purpose was entertained by Kellogg or the other sellers of this stock. If it be said that DeWolf is *particeps criminis* in this transaction, it may be replied that Kellogg could not and did not attempt to authorize him to enter into a contract against the laws or public policy of the state. Kellogg gave DeWolf a power of attorney to sell his stock if necessary to raise funds to protect his interest and that of the Kellogg company. This was a perfectly legal and proper thing to do. If DeWolf wrongfully, and in violation of the confidence reposed in him by Kellogg, entered into a secret intrigue with the representatives of the American company for the purpose of violating the laws of public policy of the State of Illinois, it cannot be said, with any show of reason, that Kellogg, who was then in California and in total ignorance of what his agent was doing in Chicago, is equal in guilt with the American company. If wrong at all is to be imputed to Kellogg, it is only in a highly technical sense and limited degree. He is certainly less blameworthy than the American company. One of the exceptions to the rule that courts will not interpose to grant relief to either party to an illegal agreement where both parties stand *in pari delicto*, is, that in some instances the party least blameworthy may, in furtherance of justice and a sound public policy, obtain full affirmative relief.

This principle is thus stated by Mr. Pomeroy in his work on Equity Jurisprudence (sec. 942), as follows: "Lastly, when the contract is illegal, so that both parties are to some extent involved in the illegality,—in some degree affected with the unlawful taint but are not *in pari delicto*,—that is, both have not, with the same knowledge, willingness and wrongful intent engaged in the transaction or the undertakings of each are not equally blameworthy,—a court of equity may, in furtherance of justice and of a sound public policy, aid the one who is comparatively the more innocent, and may grant him full affirmative relief by canceling an executory contract, by setting aside an executed contract, conveyance or transfer, by recovering back money paid or property delivered, as the circumstances of the case shall require, and sometimes even by sustaining a suit brought to enforce the contract itself, or if this be possible, by permitting him to recover the amount justly due by means of an appropriate action not directly based upon the contract. Such an inequality of condition exists, so that relief may be given to the more innocent party, in two distinct classes of cases: (1) It exists where the contract is intrinsically illegal and is of such a nature that the undertakings or stipulations of each, if considered by themselves alone, would show the parties equally in fault, but there are collateral and incidental circumstances attending the transaction and affecting the relations of the two parties which render one of them comparatively free from fault. Such circumstances are impossible, oppression, duress, threats, undue influence, taking advantage of necessities or of weakness, and the like, as a means of inducing the party to enter into the agreement or of procuring him to execute and perform it after it had been voluntarily entered into. (2) The condition also exists where, in the absence of any incidental and collateral circumstances the contract is illegal but is intrinsically unequal; is of such a nature that one party is necessarily innocent as compared with the other; the stipulations, undertakings and position of one are essentially less illegal and blameworthy than those of the other."

But there is something else here. It must be borne in mind all the while that in this proceeding a court of equity is seeking to protect the public against an infringement of the public policy of the state, and having determined that the transactions in question in their purpose and inevitable tendency are to stifle competition and create a monopoly of a business impressed with a public character, the court will not be deterred from administering full relief by forms of procedure or technical rules which might control its action under other circumstances. Regard for the public welfare is the highest law of the land. (Broom's Legal Maxims, p. 1.) Pomeroy, in his work on Equity Jurisprudence (sec. 941), thus states that the principle now under discussion: "Even where the contracting parties are *in pari delicto*, the courts may interfere from motives of public policy. Whenever public policy is considered as advanced by allowing either party to sue for relief against the transaction, then relief is given to him. In pursuance of this principle and in compliance with the demands of a high public policy, equity may aid a party equally guilty with his opponent, not only by canceling and ordering the surrender of an executory agreement, but even by setting aside an executed contract, conveyance or transfer, and decreeing the recovery back of money paid or property delivered in performance of the agreement." The cases cited by the author in the footnotes fully sustain the text. Story's Equity Jurisprudence (13th ed. vol. 1, sec. 298), recognizes the same principle. This author says: "But in cases where the agreement or other transactions are repudiated on account of their being against public policy, the circumstance that the relief asked by a party who is *particeps criminis* is not, in equity, material. The reason is, that the public interest requires that relief shall be given, and it is given to the public through the party." The rule that courts will not interpose to grant relief when an illegal agreement has been made and both parties stand *in pari delicto* cannot be invoked by appellees as a defense in this case.

We have discussed the questions, both of law and fact, upon which the right of the appellants to relief depends. There are some other questions of minor importance treated in the briefs of counsel for appellees—such as that appellants are not prosecuting the suit in good faith for their own benefit, and that there is a collusion between Kellogg and appellants—which we have considered, but we do not deem these matters of sufficient importance to require discussion. From what has been said it follows that the decree of the circuit court is based upon a correct solution of the questions involved. That part of the decree which adjusts the equities of the parties is attacked by appellees on the ground that it proceeds from an erroneous decision of the questions involved. If the sale of stocks in question were void and no title passed, as the circuit court found and as we have sought to show, we perceive no objection to the extent of the relief granted or the methods adopted by the circuit court to adjust the equities between the parties. No oher or better method of settling this controversy occurs to us and none is suggested or pointed out by appellees. The 15th of February, 1908, the date fixed by the decree of the circuit court from which time the various acts in the execution of the decree were reckoned, having passed, it is ordered that all acts which in the terms of said decree were to be performed within a given number of days from the 15th day of February, 1908, shall be performed in like manner as in said decree directed within a like number of days from the 15th day of April, 1909, and that said decree of the circuit court shall be executed in all respects as therein directed, except the 15th day of April, 1909, shall be substituted for the 15th day of February, 1908.

Believing that the decree of the circuit court does justice between the parties, enforces the law and upholds a sound public policy, and that there is no reversible error therein, the decree should be affirmed. The judgment of the Appellate Court for the First District is therefore reversed and the decree of the circuit court affirmed.

Construction in Germany

Consul-General Richard Guenther, of Frankfort, Germany, says in the Daily Consular Reports, that, owing to the low interest rates that for some months past have been ruling many of the states, cities are making use of the opportunity by issuing loans in order to raise funds to pay for needed improvements, such as railroads, electric tramways and power stations, telephones and public works of all kinds, and for some of these undertakings foreign bids might prove successful. A narrow gauge railroad track, about fourteen miles in length and estimated to cost $506,000, is to be built between Grossenlueder and Hanswurz, in the Frankfort-on-the-Main consular district. The councils of the town of Neuss have also voted for the construction of an electric railroad to connect that place with Grimmlinghausen and Neuserfurth. The bureau of manufacturers file number is 3083.

American Institute Anniversary Dinner

The American Institute of Electrical Engineers will celebrate the completion of its first quarter of a century with an anniversary dinner at the Hotel Astor, March 11. The annual dinners of the institute have always been extremely successful, while the historical character of this affair promises to make the occasion more than usually interesting. President Ferguson has appointed Mr. T. C. Martin chairman of the dinner committee. The other members appointed are as follows: T. Beran, M. Coster, M. M. Davis, H. A. Foster, G. A. Hamilton, R. T. Lozier, W. McClellan, F. A. Muechenheim, H. W. Pope, C. W. Price, F. A. Scheffler, E. A. Sperry, A. Spies, A. Williams and G. H. Guy, secretary.

In connection with this dinner, the Council has made preparation for a special certificate of congratulations, which will be given to each of the charter members, of whom about thirty are now living out of the total membership of 6,200. Each of the branches and the sections has been requested to have a special representative in attendance, and the various sister societies are to be officially represented on this occasion. There will be only a few speeches, and these will be given by men of national prominence. Special attention is being paid to decorations, music and the souvenir menu.

The following are the names and chairmen of the special committees: Speakers and menu, T. C. Martin; reception, M. Coster; finance, G. A. Hamilton; tickets and seating, R. T. Lozier; decorations, A. Williams; press and music, G. H. Guy; old timers, E. A. Sperry.

New Association Formed

Representatives of the telephone companies in southeastern Minnesota recently held a meeting at Rochester and perfected a temporary organization which is to be known as the Southeastern Minnesota Telephone Association. Over a dozen companies were represented and the following officers were chosen: F. S. Haines, Rochester, president; F. C. Marvin, Zumbrota, vice-president; R. C. Cutting, Chatfield, secretary; H. M. Tollefson, Kasson, treasurer. These officers and the following gentlemen will comprise the executive committee: M. A. Williams, Lewiston; Otto Proost, Winona, and J. E. Keane, Pine Island.

The purpose of the association is to bring the different companies into closer business relations and to bring the service into an even more satisfactory state than it is at present. It will enable the telephone companies to take up all matters relating to rates, toll service, etc., and adjust them in an equitable manner.

Some Recent Books

Telephone Construction; Methods and Cost, by Clarence Mayer, covers a field heretofore rather neglected in the compiling of reference works. The methods and cost of doing telephone construction work, construction estimating and cost keeping, are treated thoroughly and well. Telephone manufacturers, contractors and managers will find it valuable.

The author has endeavored to divide his data in such a manner that it may be applicable to the determination of construction costs in any location and under any conditions. In carrying out this purpose the book is divided into eight chapters and two appendixes, describing and illustrating methods of construction and giving rates of wages, kinds of soil and other details that affect the cost of work, in such a manner that the tables may readily be revised for varying rates and methods.

The successive chapters treat on pole-line construction and the advantages of cost records, cable construction, cable splicing, reconstruction, underground conduit, miscellaneous costs and special data, and practice of estimating. The appendixes supplement the first part of the book and give methods and costs of pole-line and conduit work, collected from various sources. Forms and blanks for recording costs are given in each chapter, as well as methods of computing, proportioning and prorating costs.

The book is well printed and neatly bound in dark cloth covers. It sells for $3.

Operating Rules and Regulations for Local and Long Distance Telephone Operators, by T. Anne Barnes, chief operator of the Interstate Telephone Company, Springfield, Ill., is a new book in more ways than one. The dearth of any standardized and classified information on the subject indicated by its title will unquestionably create a wide demand for the work.

The author has had a wide experience in operating conditions, and in compiling the knowledge thus gained has aimed to say just enough on each subject to make its thought clear and concise. She recognizes the impossibility of making a set of rules that would comprise all of the duties of an operator; but finds by careful study of conditions in the leading telephone offices of the world that there is a general similarity of ideas in operating methods. With this as a basis, she has built up a work whose precepts may be modified to suit the special requirements of any office.

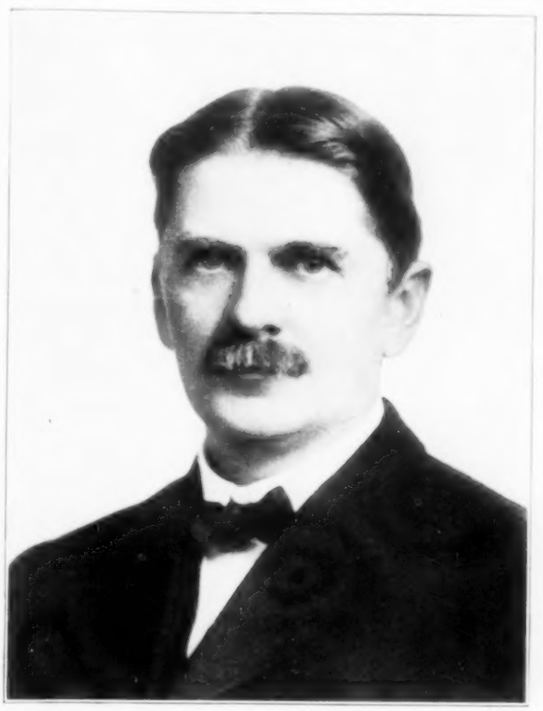
General Instructions; Responsibility of Chief Operators, Assistants and Desk Clerks; Local Operators' Instructions; Long Distance Operators' Instructions; Card Recording Systems; Method of Handling Reports on Long Distance Tickets; Method of Handling Canceled Tickets; and Trouble Records are some of the divisions of the book. Forms and illustrations are plentifully provided, and form not the least valuable part of the work. The book is printed in paper covers and sells at the low price of 50 cents.

Practical Lessons In Electricity is a compilation of selections from the textbooks used in the electrical engineering course of the American School of Correspondence, Elements of Electricity, and The Electric Current, by L. K. Sager, form the first and elementary part of the book; the second part embracing the more advanced instruction of Electric Wiring, by H. C. Cushing, Jr., and Storage Batteries, by F. B. Crocker.

The uses of electricity treated by the different parts of the book are explained in simple language, and examples are given covering typical conditions in practice. The writers selected by the school are distinguished by a clarity of style that greatly enhances the value of their work to the student. Halftone illustrations, diagrams and tables are plentiful, and all are thoroughly explained in the text. The usual review questions on each subject enable the student to test his memory of each subject he has read; but no index is provided. A few pages in the back of the book are used as a vehicle for American School advertising, which, however, does not detract from either the value or appearance of the work. It is bound in red cloth covers.

Who's Who in the Telephone Game

THE figure accompanying and forming a part of these specifications is that of Charles Ezra Scribner, holder of the endurance record as an inventor in the art of telephony. He commenced to invent things right away after he became an employee of the Gold Stock Telephone Company in November, 1876. He was eighteen then, but among the first desk accessories that suggested themselves to him was a rubber stamp made from old style pica, caps and lower case, which read: "My invention pertains to." It was meant to be a time-saver and Scribner had ideas, even then, that he would do the extraordinary; besides, he needed a spare moment now and then to think up something new. As he made progress in his chosen work the rubber stamp line was cast on a separate bar and added to the typewriter. One touch of a key started the application. Another key delivered this clause: "The nature of the invention may be more readily understood by reference to the accompanying drawings." You see, Scribner hadn't gone into the business of inventing things in any half-hearted way. He was doing a wholesale business! If he hadn't already filed an application for the particular device you were nursing as a means to "bust a trust," he always had a sketch or something, either in a pigeon-hole within his reach, or in his pocket—most likely the pocket. He was loaded to anticipate any foolishness on your part. His sympathy might have been with the ordinary inventor, but he couldn't spare him anything more than that because there wasn't any need for it. Scribner had created an inventor's class by and for himself, and a brilliant one at that.



Holder of the Endurance Record as an Inventor in the Art of Telephony.

Charles Ezra stayed with the Gold company about a year, when he was given a place with the old Western Electric Manufacturing Company, now become the W. E. Co. for short. That is the only change he ever made. His life has been too busy to flit around much. No one ever asks where he is—everybody knows. He kept right along inventing in a wholesale way till 1900, when the commissioners of the Paris Exposition heard about it and gave him a big gold medal in recognition of the number and value of his telephone patents. That considerate act merely added spirit to his work. Up to 1906 he had filed 525 applications for patents, most of which pertained to electrical science, covering dynamos and their accessories, electric lights and systems and telephone switchboard circuits, instrument circuits, line circuits and telephone apparatuses. Of these, 396 had been allowed in 1906. His inventions were never romantic. They were always practical solutions to vexing problems. The great number is accounted for by the tremendous development and extension of telephone plants.

When an improvement was made in the switchboard, it demanded a change in the instrument at the subscriber's end—or at least it changed the circuit, and an invention or so was in order. And when nothing was actually demanded, Scribner's brain kept on working just the same, turning out new ideas nicely finished.

It would be difficult to designate any special pet in such a formidable array. To the genius of this man the multiple switchboard has been created in all its marvelous and intricate detail. His work easily overtopped all other inventions in telephony and the result of his labor can be found all over the world.

To the great talent of this unassuming marvel in electrical conception and application the telephone industry owes much. The extreme demand made upon any existing system has required a Scribner to make it efficient; and fortunately for the telephone business, it had a Scribner in reserve.

Since his manhood and achievement began in 1876 no one seems to have been interested in his boyhood. However, he was born at Mt. Vernon, Ohio, fifty-one years ago, February 16. He went to school at Toledo. In his family tree there was only one inventor, so there is nothing to be credited to heredity on this side. The tree runs back to 1680, when the family first landed in America. They were called "Scrivener" then. A certain inventing Thomas changed the spelling to the more modern method.

Charles E. Scribner was well born, well bred, well fed, well read and well disciplined. He is not afflicted with the dry-rot of intellectual despair. His insight became a guiding force to himself and his coworkers. His temperament is charming, his nature sound, his heart affectionate, his appreciation wide. And yet he knows what bib-overalls are. He wears them now—when he fusses with his steamer. No gasoline buggy for him when he can have his bubble wagon. It's great, this hobby business. And he enjoys living. In the summer, with his wife and three children, he can always be found among the Green Mountains for recreation, whether the "Honorable Commish" allows any new patents of his or not. He is a member of the Wool Club, New York; the Union League, Kenwood and Midlothian clubs, Chicago, besides holding honorary and active membership in numerous engineering and technical organizations.

Recent Telephone Patents

By David S. Hulfish

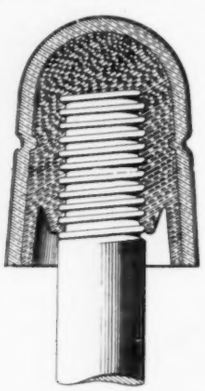
It will be the purpose of this department to list all United States patents, as they are issued, which pertain to any branch of the telephone business, giving such data in each case as will enable the reader to judge whether he wishes to see the complete drawings and specifications of the patent. When patents of special interest to TELEPHONE ENGINEER readers are encountered, the descriptive matter herein will be amplified accordingly. A complete copy of drawings, specifications and claims of any patent listed will be furnished from this office upon receipt of ten cents.

909,935. Protected Insulator. An insulator of the usual "pony" shape has a metallic outer jacket cemented to the inner breakable insulating body. John H. B. Rea, LaFayette, Ga.

909,943. Wire Connector. A connector for line splices. Two tapering members are so interlocked that the strain of the line wires tends to draw them into closer contact. John M. Sahlin, Chicago, Ill.

910,176 and 910,177. Anti-Induction System. The object of the invention is to eliminate disturbances set up by induction upon a telephone line. The method consists of providing means for causing the disturbing causes to set up currents contrary in direction and of equal strength which therefore nullify each other. It is set forth that by a proper balance of parts the inductive disturbances may be nullified without nullifying the currents of the telephonic speech transmission. William Condon and Albert Barrett, of Kansas City, Mo.

910,189. Attachment. This is an attachment for a desk telephone and is adapted to hold the receiver in such a position



909,935.

that the telephone user's ear may be placed against it without the use of the hands. This leaves both hands free for work upon the desk while the telephone is being used. Joseph C. Fox, Seattle, Wash.

910,244. Receiver. Two sets of permanent magnets are used, and two receiving coils for the incoming speech currents. The magnetic flux of both sets of magnets traverses an armature which is connected by a short arm to a sounding diaphragm. By this arrangement, a comparatively small and comparatively heavy armature and a very light diaphragm is used. Great efficiency and loud speaking properties are claimed. Harve R. Stuart, Wheeling, W. Va.

910,314. Telephone Switchboard System. A three-conductor multiple system, using three-way cords. It presents a clean, clear pair of speech-carrying conductors when two lines are connected. William Reid, Chicago, assignor to Kellogg Switchboard & Supply Company, of same place.

910,383. Sanitary Transmitter Shield. This is a thin, elastic rubber shield for transmitter mouthpieces, for hygienic purposes. Owen H. Hudgen, Los Angeles, Cal.

910,603. Receiver. The entire electromagnetic system of the receiver is constructed upon a metal cup clamped between the case and the cap. A diaphragm having a reinforced edge is shown, and the claims are directed toward that point. Alfred Stromberg, Chicago, Ill.

910,622. Transmitter. This transmitter is of the audiphone type, designed to be used for transmitting speech in places where the speaker is necessarily at considerable distance from the transmitting instrument. The novelty resides principally in the combination of the resistance varying elements with a sounding board placed at the back of the transmitter for reflecting and reinforcing the sound. Charles E. Williams, Natick, Mass.

910,628. Coin Collector. In this coin device, the telephone line is normally inoperative, but it is made operative by the deposit of a coin. The coin is released by the central office operator over a circuit additional to the telephone transmission line, the operator removing a detent electromagnetically, and the coin being released by a spring motor. Richard Yearneau, Clark, S. Dak.

910,799. Insulator Pin. A split pin with a tooth for engaging the cross arm to prevent withdrawing. Samuel G. Edmiston, Greenwich, N. Y.

910,873. Signal System. A system for ringing magneto party lines. It is a refinement of the "lamp magneto" switchboard to eliminate an annoyance which has existed previously. Where a locking clearing relay has been used, the "kick" of a line when rung upon sometimes would "set" the locking relay and display the clearing lamp. Mr. Simpson provides a "slow acting" relay which short circuits the clearing relay until after a rung line has discharged any ringing charge which it might have had at the end of ringing. Charles A. Simpson, Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, of same place.

910,918. Attachment. A support for wall sets, to hold the receiver while in use. Robert S. Griffith, Berkeley, Cal.

910,965. Terminal. A dry cell is illustrated having its carbon element equipped with a tightly coiled spring. The connecting conductor is passed between the coils of the spring. Johann F. Siems, Columbus, Neb.

911,032. Terminal Slip. A spring-clip terminal for flexible cords for connecting the conductors to binding posts. William E. Dow, Braintree, Mass.

911,055. Mounting for Fuses. A fuse mounting comprising a tube, a body of soft metal moulded about the end of the tube, and a terminal screw embedded in the body of soft metal, and projecting therefrom. John J. Lyng, New York, N. Y., assignor to Western Electric Company, of Chicago, Ill.

911,101. Transmitter. The transmitter is of the audiphone type, for collecting sounds from considerable distances. The electrode is of the type having numerous cups for holding granular carbon, but the cups are made to go entirely through the electrode, being in fact holes through the electrode. Other deviations from the usual stereotyped transmitter are shown, for all of which improved transmission is claimed. Charles E. Williams, Natick, Mass.

911,178. Receiver. The receiver shown is the operator's head type. The improvement consists in providing a spark gap within the receiver case, to divert from the magnet windings heavy discharges which would be objectionable to the ears of the user. Herbert W. Sullivan, London, England.

911,181. Intercommunicating Set. The set comprises a telephone set with switchhook lever in connection with a selecting switch for selecting the line desired. The selecting is accomplished by push buttons which lock when pushed in, and means are provided for unlocking the buttons either when another button is pushed, or when the receiver is hung upon the hook. H. C. Thompson, Boston, Mass., assignor to Electric Goods Manufacturing Company, of same place.

911,188. Trunk Circuit. The trunk is adapted for service from a magneto central office to a common battery central office. C. S. Winston, Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, of same place.

911,231. Testing System. This patent covers circuit relations between the lines of a multiple switchboard and the plugs of the connecting cord pairs whereby busy test conditions are provided. H. C. Goldrick, Indianapolis, Ind., assignor to Kellogg Switchboard & Supply Company, of Chicago, Ill.

Of Interest to the Trade

Preliminary Government Report

The Department of Commerce and Labor, Bureau of the Census, S. N. D. North, director, Washington, D. C., issues under date of February 18 the following preliminary report on the number of telephones or stations in the continental United States, tabulated by states, to December 31, 1907:

	Total	Independent (non-Bell)	Bell (American T. & T. Co.)	Stations Independent connected with Bell System
United States	6,118,578	2,986,515	3,132,063	*835,880
Alabama	40,481	14,985	25,496	3,944
Arizona	6,203	3,148	3,055	....
Arkansas	49,576	32,150	17,426	10,265
California	237,672	65,977	171,695	9,607
Colorado	65,908	4,473	61,435	1,620
Connecticut	63,898	1,815	62,083	352
Florida	17,522	11,160	6,362	3,691
Georgia	62,260	26,204	36,056	9,072
Idaho	16,394	5,754	10,640	1,288
Illinois	558,585	285,322	273,263	109,101
Indiana	289,452	216,990	72,462	50,065
Iowa	332,545	279,773	52,772	74,806
Kansas	200,233	161,913	38,320	66,880
Kentucky	93,996	51,796	42,200	9,038
Louisiana	35,692	6,184	29,508	4,351
Maine	53,134	16,024	37,110	7,830
Maryland, D. C., & Del.	110,282	19,896	90,386	217
Massachusetts	209,383	5,324	204,059	650
Michigan	209,842	106,049	103,793	30,933
Minnesota	171,479	114,618	56,861	46,547
Mississippi	37,627	13,567	24,060	5,235
Missouri	312,527	220,823	91,704	82,393
Montana	17,168	8,118	9,050	846
Nebraska	153,279	105,610	47,669	45,252
Nevada	4,601	2,081	2,520	734
New Hampshire	28,920	6,488	22,432	2,482
New Jersey	116,988	19,134	97,854	831
New Mexico	6,653	3,476	3,177	759
New York	685,512	180,759	504,753	23,992
North Carolina	37,104	20,597	16,507	4,714
North Dakota	34,087	26,635	7,452	10,542
Ohio	495,636	312,278	183,358	29,284
Oklahoma	68,125	38,009	30,116	36,570
Oregon	49,629	16,223	33,406	10,675
Pennsylvania	450,403	174,582	275,821	11,976
South Carolina	20,911	7,872	13,039	1,867
South Dakota	48,405	44,751	3,654	25,939
Tennessee	71,130	25,758	45,372	9,241
Texas	187,862	108,832	79,030	30,334
Utah	30,630	10,528	20,102	451
Vermont	30,833	13,917	16,916	7,020
Virginia	55,541	24,118	31,423	4,447
Washington	98,846	35,652	63,194	9,168
West Virginia	62,144	46,609	15,535	3,238
Wisconsin	158,875	89,005	69,870	36,366
Wyoming and R. I.	30,605	1,538	29,067	1,267

*Figures furnished by American Telephone and Telegraph Company; Included in total for Independent.

Harvard Electric Company's Growth

The Harvard Electric Company, Chicago and New York, has begun the year 1909 with numerous evidences of growth. Its president, Frederic Greer, is one of those who predict great things for the coming era of prosperity. The company has recently greatly increased its space and more than doubled the capacity of its plant.

The company manufactures Harvard patent channel steel brackets, beveled-edge wire joints, sectional switch boxes, conduit boxes, telephone fuses, lightning arresters, fuse wire, fuse strip, open fuse links, magnet winders, cable hangers, portable lamp guards, test connectors, etc.

The advance 1909 (No. 17) bulletin, illustrating a part of the products of the company, has just been issued and distributed to the trade. Copy of this bulletin will be sent to any one interested upon request.

In this connection the company wishes to deny absolutely the statement of a competitor to the effect that the Harvard Electric Company had or intended to discontinue the manufacture and sale of Harvard brackets. Mr. Greer prefers to believe that this impression (which was given out by a manufacturer of a bracket similar to the Harvard) was done through an honest lack of knowledge of the Harvard business. He says:

"Anyone who says that the Harvard Electric Company has discontinued the manufacture of Harvard channel steel brackets, or any other specialty, says that which is false in every particular. If in the future the good sense of electrical trade, not less than the good faith of the Harvard Company is insulted by the repetition of this falsehood you will do the Harvard Electric Company a favor by writing the facts direct to Frederic Greer, president, 66 West Van Buren street, Chicago."

Cuyahoga Company's Report

The November report of the Cuyahoga Telephone Company, Cleveland, makes the usual good showing in net earnings. The surplus for common stock of $17,069.94 is at the rate of 13¾ per cent earned for the junior shares. The report compares with the corresponding month last year as follows:

	Nov., 1908.	Nov., 1907.
Gross earnings	$68,845.26	$67,079.25
Total expenses	30,189.64	33,017.54
Net earnings	38,655.62	34,061.71
Interest on bonds	11,283.33	11,250.00
Surplus	27,372.29	22,811.71
DEDUCTIONS.		
Dividend on preferred stock	7,186.75	7,186.75
Reserve for depreciation	3,115.60	2,655.26
Total deductions	10,302.35	9,842.01
Surplus	17,069.94	12,969.70

New Peirce Specialty Bulletins

The Peirce Specialty Company, Elkhart, Indiana, is bringing out a series of bulletins numbered from five to twelve, describing its line of all-steel insulator brackets and other construction specialties. The company reports the increase in users of its steel brackets to have been greater in the year 1908 than any previous year in its history. Anticipating the probable demands for the coming year, the company has added considerably to its line of brackets, and brought out a number of other specialties which should be of interest to every telephone engineer. A postal request will bring all bulletins so far published, and place readers of TELEPHONE ENGINEER on the mailing list for future bulletins as they come from the printers.

"Kirk-Konduit"

E. F. Kirkpatrick announces the organization of the Kirkpatrick Conduit Company, Chicago, with perfect facilities for the prompt shipment of high-grade conduit. The principal factory is located at Grand Ledge, Mich., and its modern appointment and superior product are matters of interest to all users of conduit.

PERSONAL NOTES.

Harmon Harry Woodworth, advertising manager and assistant sales manager of the Automatic Electric Company, Chicago, died February 25 after an illness of five weeks. He was taken down through general disability, which afterwards developed into a very bad case of rheumatism and later into heart trouble, which caused his death. Mr. Woodworth was born at Moline, Ill., July 13, 1876, and educated in the Moline public schools. He moved to Chicago in 1895, where he entered the street car advertising business, later representing a large Detroit tobacco firm in Chicago. He served in the pay department of the United States Navy during the Spanish-American war, being stationed on the Flag Ship Lancaster at Key West, Fla. In July, 1900, he joined the editorial staff of the Chicago Times-Herald. His connection with the Automatic Electric Company dates from June, 1904, when he became advertising manager of that concern. July 1, 1907, he was given the additional title of assistant sales manager. The death of Mr. Woodworth in his very prime comes as a stunning blow to his friends—and they were legion. Known affectionately to them as "Woody," his was the nature that ever commands respect while sounding the deepest wells of friendship. The greatest tribute that can be paid to him comes from both his social and business associates—and there was no hard line between the two—in the words "He cannot be replaced." He leaves a wife and little son, whose grief finds response in every heart that knew him.

J. H. MacNichol has resigned as manager of the Pacific Telephone and Telegraph Company's office at Colfax, Wash., and has been succeeded by H. W. Schilling, formerly of the Spokane office.

Rollo R. Stevens has been promoted to be division sub-license agent of the Central Union Telephone Company, with offices in the new First National Bank building, Columbus, Ohio. Mr. Stevens succeeds A. L. Irish, who has been appointed division superintendent, with headquarters at Akron.

M. B. Larrimore has resigned his position as superintendent of the Home Telephone Company of Fort Wayne, Ind., to accept the presidency of the Protective Electrical Supply Company. E. M. Popp, formerly auditor of the telephone company, becomes secretary-treasurer of the Protective company.

J. Morgan Bigelow has been promoted to the managership of the Home Telephone Company of Los Angeles, Cal.

C. B. King has been appointed general manager of the Charlestown Home Telephone Company, Charlestown, W. Va. Mr. King has been general manager of the Washtenaw Home Telephone Company at Ann Arbor for the past four years.

Orrin F. French has resigned his position as chief engineer of the Manitoba Government Telephone Department.

O. Higman has been appointed manager of the Government telephone system, Edmonton, Alberta, Can.

Frank Fiolle is the new manager of the Thomas Home Telephone Company, Thomas, Okla.

J. A. Brown, formerly of Mason City, Iowa, has been appointed manager of the Sheldon Telephone Company, Sheldon, Iowa.

M. P. Shank has taken charge of the Citizens' Telephone Company's system at Washington, Ohio.

A. J. Mackey has been promoted to the managership of the Missouri and Kansas Telephone Company at Topeka, Kans.

A. J. Richards, formerly manager of the Government telephone system at Edmonton, Alberta, Canada, has been appointed superintendent, with headquarters at Calgary.

J. Clark Morgan, Grafton, W. Va., has been appointed general manager of the West Virginia Eastern Telephone Company, Elkins, W. Va.

Maurice Quaine, formerly with the Cranbrook Light and Power Company, has been appointed superintendent of the Kootenay Telephone Company, Ltd., Cranbrook, B. C.

J. A. Lowden, Knoxville, Iowa, will assume the management of the Lawton Telephone Company, Lawton, Iowa, March 1.

B. H. Courtney, manager of the Northwestern Telephone Exchange Company, Grafton, N. D., has been promoted to the management of the company's exchange at Grand Forks, N. D.

Frank Meeker has been appointed manager of the Buckeye Lake Home Telephone Company, with exchanges at Thurston and Baltimore, Ohio. Mr. Meeker was formerly with the Central Union Telephone Company at Lancaster.

M. A. Erskine, Atlanta, Ga., has been appointed manager of the Asheville Telephone and Telegraph Company, Asheville, N. C.

Jas. Bonell, Jr., manager of the Wisconsin Telephone Company's exchange at Stanley, has been promoted to the same position at Menominee.

R. E. Allen has been appointed manager of the Central Union Telephone Company's exchange at Bowling Green, Ohio.

Charles M. Hurd, Pomeroy, Iowa, has been elected general manager of the Traer Mutual Telephone Company, Traer, Iowa.

E. R. Dickerson has been appointed exchange manager of the Badger Telephone Company, Oconomowoc, Wis. He will also have charge of all construction work.

CONVENTIONS.

The Iowa Independent Telephone Association will hold its annual convention at Des Moines, Iowa, March 9-11.

The Ohio Independent Telephone Association will hold its annual convention at Columbus, Ohio, March 18.

The Michigan Independent Telephone Association will hold its annual convention at Saginaw, Mich., March 23 and 24.

The annual convention of the Kansas Independent Telephone Association will be held at Topeka, Kans., March 16-18.

NEW TELEPHONE COMPANIES.

Merced, Cal.—The Dos Palos Telephone Company has been incorporated by H. T. Reynolds, A. S. Woodhouse, George Christian and others.

Elberton, Ga.—J. B. Vaughter, W. R. Gaines, H. S. Hansard and others have organized a telephone company to construct a line connecting with Elberton.

Augusta, Ill.—The Augusta-La Prairie-Eli Telephone Company has been incorporated by J. E. Pettijohn, Henry Ippensen and S. L. Miller; capital stock, $1,000.

Cross Plains, Ind.—The Farmers' Mutual Telephone Company has been organized with a capital stock of $890. President, Daniel Denmore; secretary-treasurer, Martin Vanosdall.

Fountaintown, Ind.—The Brandywine Telephone Company, organized by Richard W. Lowe, J. E. Gunn, W. E. Reese and James P. Scott, has been incorporated.

Jamestown, Ind.—The People's Co-operative Telephone Company has been incorporated by George W. Pierson and others.

Salem, Ind.—The Kansas Telephone Company has been incorporated with a capital stock of $5,000. Incorporators, Frank P. Martindale, Omer F. Mitchell and A. O. Marshall, Salem R. R. 7.

Lone Tree, Iowa.—The Palestine Mutual Telephone Company has been incorporated; capital stock, $2,000. The officers of the company are: President, Charles Shellady; secretary, James Duff; treasurer, E. Miller.

Clermont, Iowa.—The Gunder and Clermont Telephone Company has been incorporated with a capital stock of $4,000. The officers are: President, H. S. Groth; vice-president, O. A. Olson; secretary-treasurer, G. L. Ostlie.

Brinkley, Ky.—The Sassafras-Ball Telephone Company has been organized by James Garnette and others with a capital stock of $1,000.

Harlan, Ky.—The Harlan Telephone Company has been organized by F. G. Green, H. D. Hall and others; capital stock, $4,000.

Little Cypress, Ky.—The Little Cypress Telephone Company has been incorporated with a capital stock of $2,000 by E. R. Goodloe, R. L. Holland and R. M. Jones.

Est, Ky.—The Est Telephone Company was recently organized at this place by Felix and Coldron and others, with a capital stock of $2,000.

Farmington, Ky.—The Farmington Telephone Company has been incorporated; capital stock $5,000. Incorporators, J. C. Shelton, J. J. Trumbo, D. C. Turner. J. C. Shelton is manager.

Sedalia, Ky.—The Sedalia Telephone Company has been incorporated with a capital stock of $5,000 by A. K. Jones, R. F. Jones and G. G. Carman, all of Sedalia.

Lynnville, Ky.—The Lynnville Telephone Company has been organized by B. B. Pryor, Henry Connor and C. M. Richardson.

Pilot Oak, Ky.—The Pilot Oak Telephone Company has been incorporated with a capital stock of $1,500. Incorporators, J. A. Shelby, I. T. Howard and M. H. Eames.

Northville, Mich.—The Inter-County Telephone Company has filed articles of incorporation with a capital stock of $5,000. Directors, Clement C. Yerkes, Louis S. Babbitt, Robert C. Yerkes, Frank Thompson, Frank A. Levins.

Springvale, Mich.—The Springvale Telephone Company has been incorporated with a capital stock of $1,800.

Redwood Falls, Minn.—The Redwood Falls Electric Telephone Company has been incorporated with a capital stock of $50,000. Incorporators, H. A. Baldwin, J. P. Cooper, W. D. Gines, A. J. Stewart and H. M. Aune.

Lent, Minn.—The Stacy Telephone Company has been incorporated with a capital stock of $5,000. The directors are C. O. Anderson, A. J. Lavender, W. H. Eastman, H. A. Shorrecks, H. C. Keacher, John Allquist, Sanford C. Broadway.

Browerville, Minn.—The Ward and Moran Telephone Company has been organized, with E. T. Crist as president and Frank Haverick secretary.

Aitkin, Minn.—The Aitkin Telephone Company has filed articles of incorporation; capital stock $24,000. Incorporators, Herman Moore, F. M. Shook, Aitkin; C. P. De Laittre and J. L. De Laittre, Minneapolis.

Austin, Minn.—The Corning Co-operative Telephone Company has been organized with the following directors: Olaf Christianson, Sanford Christianson, Nels Listegard and Chris Christianson.

Crookston, Minn.—The Russia-Fairfax Telephone Company has been organized with the following officers: President, B. Hinton; vice-president, Seivert Qualberg; secretary, O. Sanness; treasurer, E. Durdahl.

Brown's Valley, Minn.—The Brown's Valley Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are: S. Y. Gordon, J. L. Paul, John Keiserling, and others.

Valda, Mo.—A telephone company has been organized with the following officers: President, D. W. Stephens; treasurer, Fred Meyer; secretary, Milton Smith.

Curryville, Mo.—The People's Telephone Company has been organized, with E. Sparks as president of the company and Ira Stone secretary-treasurer.

Rich Hill, Mo.—The Ray Telephone Company has been organized with the following officers: President, James Baughan; vice-president, Pete Flexner; secretary, George J. Reik; treasurer, Frank Ford.

Lincoln, Neb.—The Lincoln Telephone and Telegraph Company of Lincoln has been incorporated with a capital stock of $2,500,000, by J. W. McDonald, C. J. Bills, Frank H. Woods, and others.

Eddyville, Neb.—The Eddyville Telephone Company has been incorporated with a capital stock of $1,000 by P. G. Muchie, W. J. Lawson, and others.

Omaha, Neb.—The American Telephone and Telegraph Company has filed articles of incorporation for the purpose of operating country telephone exchanges. Capital stock, $200,000. The officers are: President, Charles H. Bangs; vice-president, Charles D. M. Cole; secretary, Melville Engleston; treasurer, James C. Vail; directors, Edgar M. Morseman, Jr., and Hal J. Ryner.

Rensselaer, N. Y.—The Rensselaer Home Telephone Company has been incorporated with a capital stock of $50,000. The incorporators are: Irving H. Griswold and Irving R. Coughtry of Albany; Matthew A. Heeran, Bradford R. Lansing and Simon E. Cordial of Rensselaer; John J. Hartigan, James H. Caldwell, William J. Roche and Edward L. Grauel of Troy.

Lyndon, N. Y.—The Lyndon Telephone Company has been organized with a capital stock of $1,000. The officers are: President, Charles Stimson; secretary, J. J. Maxwell; treasurer, R. W. Little.

Middleton, N. Y.—The Telephone Operating and Construction Company has been incorporated with a capital stock of $2,500, by Edwin Fancher, Sayer Fancher, Edmund Miller, and others of this city.

Harlemville, N. Y.—The Harlemville-Chatham Co-operative Tele-

phone Company has been incorporated with a capital stock of $600; incorporators, John B. Jones, William H. Angel, of Ghent; John Freehan, Peter Dexheimer and Frank W. Wolfe, of Austerlitz, and Frank McNeil of Hillsdale.

MIZPAH, N. C.—The Quaker Gap Telephone Company has been incorporated with a capital stock of $3,000, by W. G. Slate, J. W. Slate, and W. C. Slate.

COOLEMEE, N. C.—The Coolemee Telephone Company has been incorporated with a capital stock of $10,000, by J. M. Ledford, J. A. J. Rice, and others.

LITTLETON, N. H.—The Littleton Telephone Company has been incorporated with a capital stock of $5,000. The officers are as follows: President, George A. Edson; vice-president, Frank P. Bond; secretary, I. N. Lunderville.

ARTESIA, N. M.—The Artesia-Plains Telephone Company has been incorporated.

FARGO, N. D.—The Reed and Raymond Telephone Company has been incorporated by Hans Hoglund, Harwood; N. B. Pinkham, Fargo; O. K. Hanson, Harwood, and others; capital stock, $11,250.

STEELE, N. D.—The Kidder County Telephone Company has been incorporated with a capital stock of $10,000; incorporators, John B. Spangler and Mary F. Spangler, Steele; George B. Perham, Fargo.

NEW HOME, N. D.—The Skyeston and New Home Telephone Company has filed articles of incorporation. Capital stock, $10,000; incorporators, C. C. Guenther, Dick Jensen, John Ran, and others.

INKSTER, N. D.—The Parker Telephone Company has been incorporated by M. L. Dryburgh, Angus Johnson, Hedford; J. R. Barry, Inkster. The capital stock is $10,000.

MEDINA, N. D.—The Central Telephone Company has been incorporated by William J. Dwyer, and others; capital stock, $100,000.

MARYSVILLE, O.—The Union County Farmers' Telephone Company has been organized; capital stock, $24,000. The officers are: President, J. D. Coe; vice-president, Charles Vanhining; secretary, William Plottner; treasurer, J. O. Thomas.

BRIDGEPORT, O.—A telephone company has been organized with the following officers: President, J. W. Bartlett; secretary, D. F. Charpening; manager, D. Q. Lawson.

MT. CORY, O.—The Mount Cory Telephone Company has been incorporated by W. A. Williamson, and others.

GEARY, OKLA.—The Alfalfa Telephone Company has been incorporated with a capital stock of $1,000; directors, A. B. Campbell, Otto Pallas, T. P. Quayle.

COUNCIL HILL, OKLA.—The Council Hill Telephone Company has been incorporated. Capital stock, $10,000; directors, J. D. Faulkner and Robert Ward, Chectotah; Thevor Faulkner and Otto E. Sump, Council Hill.

CACHE, OKLA.—The Wichita Telephone Company has been incorporated with a capital stock of $8,000; directors, W. K. Miller, W. E. Leckie, C. E. Hank, all of Cache.

PLEASANT HILL, OKLA.—The Pleasant Hill Farmers' Mutual Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are George W. Tannehill, W. F. Grinborg, and C. F. Tibbits.

RUSH SPRINGS, OKLA.—The Isabella-Rush Independent Telephone Company has been chartered with a capital stock of $10,000. The directors are: J. A. Carver, W. T. Ruby, C. W. Runkin, A. C. Camp, W. E. Perkins.

FRUITLAND, ORE.—The Farmers' Mutual Telephone Company has been organized with the following officers: President, B. F. Tussing; secretary, H. E. Smith.

STERRETT, OKLA.—The Sterrett Telephone Company has been organized.

TALOGA, OKLA.—A telephone company has been organized with W. H. Hixon, president; Pearl Wilson, secretary; M. A. Mixon, treasurer. Capital stock, $5,000.

MILES, OKLA.—A telephone company is being organized by M. South, and others.

JASPER, ORE.—A new telephone company has been organized with Gainey Jacoby as president.

LEWISTOWN, PA.—The Juniata Valley Telephone Company has been incorporated; capital stock $5,000. The directors of the company are as follows: Amor A. Strode and Geo. B. Pennepacker, Strodes Mills; J. P. Aikens, I. Strode Felker and G. Howard Pearson, Lewistown.

HARRISBURG, PA.—The Brokenstraw and Stillwater Telephone and Telegraph Company has been incorporated; capital stock $25,000. Directors, John A. Day, Frank D. Kinnear, Youngsville; W. A. Alexander, Warren.

PINE GROVE, PA.—The Pine Grove and Cressona Rural Telephone Company has been incorporated with a capital stock of $5,000. Treasurer, C. H. Maidenford.

HUNTINGDON, PA.—The Standing Stone Telephone Company has been incorporated; capital stock $5,000. Directors, George C. Wilson, Tyrone; Wallace Wilson, Alexandria; C. C. Curns, Huntingdon.

BURNS, ORE.—The Eastern Telephone and Telegraph Company has been incorporated with a capital stock of $10,000. Incorporators, J. R. Jenkins, J. H. Hordan and E. T. Jenkins.

ELIZABETH, PA.—A telephone company has been organized with the following officers: President, J. W. McKinney; vice-president, J. H. Christy; secretary, W. P. Caldwell; treasurer, A. F. Peairs.

ALTOONA, PA.—The Homer's Gap Telephone Company has been incorporated with the following officers: President, John Smith; vice-president, George Moyer; secretary, Charles R. Foutz; treasurer, B. Mathers.

DARLINGTON, S. C.—Application has been made for a charter for the Mechanicsville Telephone Company; capital stock $800.

GILBERT, S. C.—The Hollow Creek Telephone Company has been organized. President, Haskell Shull, R. F. D. No. 2.

ARDMORE, S. D.—The Ardmore Telephone Company has been incorporated; capital stock $3,750. Incorporators, James A. Bell, Laurson; Charles S. Williams, Scott W. Hill, Jay F. Blessing, Ardmore; Chester L. Jensen, Hot Springs.

TRIMBLE, TENN.—The Trimble Telephone Company has been incorporated with a capital stock of $5,000. Directors, R. V. Thomas, J. H. McKennon, T. A. Pierce.

MARATHON, TEX.—The Marathon Telephone Company has been incorporated with the following officers: President, J. G. Reininger; vice-president, G. C. Miller; treasurer, L. L. Hess; secretary, W. J. Newsome.

PORT LAVACA, TEX.—The Port Lavaca Telephone Company has been incorporated with a capital stock of $20,000. Incorporators, W. C. Best, H. C. Innis, Willett Wilson.

FRONT ROYAL, VA.—The Liberty Corner Mutual Telephone Company has been incorporated with a capital stock of $250 to $5,000. The officers are: President, R. J. Stokes; vice-president, John Derflinger; secretary, C. E. Brown.

BARNEVELD, WIS.—The Barneveld and Hollendale Telephone Company has been incorporated; capital stock $1,250. Incorporators, O. L. Theobald; E. M. Pearce, George J. Theobald, R. W. Theobald, James H. Theobald, J. B. Watkins.

CASHTON, WIS.—The New Cashton Telephone Company has been incorporated; capital stock $24,000. Incorporators, C. H. Cremer, Henry W. Cremer, Anna Schweiger.

DEER CREEK, WIS.—The Midway Telephone Company has been incorporated with a capital stock of $10,000. Incorporators, M. B. Brizke, Almer R. Erickson, D. F. Peterson.

MONTICELLO, WIS.—The Mt. Pleasant Farmers' Telephone Company has been incorporated. The officers are: President, Matt Marty; secretary, C. D. Kennedy; treasurer, Baltz Volgell; trustees, J. H. Dowd, Oswald Zentner.

WINLOCK, WASH.—The Winlock Home Telephone Company has been incorporated; capital stock $5,500. Incorporators, J. A. Veness, Andrew Johnson, A. W. McFee.

WESTBORO, WIS.—The Westboro Telephone Association has been organized with the following officers: President and general manager, J. W. Kaye; secretary and treasurer, C. C. Lord.

TORRINGTON, WYO.—The Torrington Mutual Telephone Company has been incorporated; capital stock $5,000. The officers are as follows: President, Wm. G. Curtis; secretary, W. B. Coy.

HANNON, ONT., CAN.—The Barton and Binbrook Telephone Company has been organized with the following directors: H. Johnson, N. Laidman, T. E. Tidey. Capital stock $10,000.

FRANCHISES ASKED AND GRANTED.

NEW LEXINGTON, OHIO.—The Independent Telephone Company of this place has been granted a franchise at Somerset.

CRAWFORDVILLE, IND.—The Central Union Telephone Company has asked for a new franchise in this city, offering to surrender its present franchise in exchange.

DIXON, ILL.—The Board of Supervisors has granted a franchise to the Exchange Telephone Company to operate in Lee county.

JASONVILLE, IND.—T. J. McGrew has been granted a franchise to operate a telephone system in this town.

GRAND RAPIDS, MINN.—The Mesaba Telephone Company has been granted a franchise by the town council.

GLENWOOD, MINN.—H. G. Hall and B. D. Templeman have been granted a franchise by the village council.

SPRINGFIELD, MO.—W. M. Mooneyham, George Norman, George O'Bryant and others have been granted a franchise to construct a telephone line from Republic to Needmore.

WASHBURN, N. D.—The Bloomington Valley Telephone Company has applied for a franchise to operate a telephone system in McLean county.

HURON, S. D.—F. H. Kent, C. F. Koepp, William Waibel, S. P. Malone, J. R. Hinman, J. W. Campbell and Charles E. Bryant have been granted a franchise to operate a telephone system in Huron.

DICKINSON, N. D.—The Belfield and Northern Telephone Company has been granted a 20-year franchise.

SOUTH HILL, VA.—The town council has granted Norborne G. Smith a franchise to install a telephone system.

SPOKANE, WASH.—The County Commissioners have granted a 25-year franchise to the farmers in the vicinity of Moab for the purpose of constructing a line from Moab to Newman Lake.

FINANCIAL ITEMS.

TAMPICO, ILL.—The Farmers' Mutual Telephone Company has increased its capital stock from $6,000 to $10,000.

NASHVILLE, ILL.—The Farmers' Mutual Telephone Company of this place has increased its capital stock from $1,400 to $2,000.

NORTH MANCHESTER, IND.—The Eel River Telephone Company has filed notice of increase of capital stock from $10,000 to $40,000.

LAKE CITY, MICH.—The Missaukee Telephone Company has decided to increase its capital stock from $20,000 to $40,000.

NORTON, N. D.—The Norton Farmers' Telephone Company has increased its capital stock to $30,000.

STOCKPORT, OHIO.—The Morgan County Farmers' Telephone Company has increased its capital stock from $5,000 to $30,000.

TIPPECANOE CITY, OHIO.—The Tippecanoe International Telephone Company has increased its capital stock from $30,000 to $40,000.

LE MOYNE, OHIO.—The Le Moyne Telephone Company has increased its capital stock from $2,500 to $10,000.

SOMERSET, PA.—The capital stock of the Central Telephone Company has been increased from $5,000 to $10,000.

CAMP CROOK, S. D.—The Eklaka Telephone Company has increased its capital stock from $5,000 to $25,000.

YORKVILLE, TENN.—The Yorkville Telephone Company has decided to increase its capital stock from $5,000 to $10,000.

RICHMOND, VA.—The Carolina County Telephone Company has been granted permission to increase its capital stock from $10,000 to $15,000.

NEWTON, WIS.—The Newton-Manitou Telephone Company has increased its capital stock from $2,000 to $4,000.

BLAINE, WIS.—The St. Croix Farmers' Mutual Telephone Company has increased its capital stock from $3,000 to $6,000.

ELLSWORTH, WIS.—The Pierce County Telephone Company has increased its capital stock from $50,000 to $100,000.

RESEBERG, WIS.—The Reseberg Mutual Telephone Company has increased its capital stock from $1,490 to $3,000.

ELKHART LAKE, WIS.—The Eastern Wisconsin Telephone Company has increased its capital stock from $15,000 to $25,000.

GLENWOOD, WIS.—The capital stock of the West Wisconsin Telephone Company has been increased from $12,000 to $20,000.

MISCELLANEOUS.

LAVONIA, GA.—Arad B. Vickery has purchased the Lavonia Telephone Company.

SANTA MONICA, CAL.—An ordinance has been passed requiring the Sunset Telephone Company to place its wires underground in certain parts of the city, which will entail a cost of at least $15,000.

SAN BERNARDINO, CAL.—The Home Telephone Company will at once begin rebuilding its system in this city at an estimated cost of $50,000.

FORT COLLINS, COLO.—The Colorado Telephone Company will erect a local exchange building at a cost of $15,000.

SOLDIER, IDAHO.—The Soldier Local Telephone Company contemplates the expenditure of over $15,000 in improvements during the present year.

PARIS, ILL.—The Central Union Telephone Company has appropriated $40,000 to be spent in the improvement of its local plant and the extension of country lines.

LEAF RIVER, ILL.—The Leaf River and Eagan Mutual Telephone Company will install a new switchboard and make other improvements.

VERGENNES, ILL.—The Jackson County Telephone Company will install a new switchboard.

CORNELL, ILL.—The Cornell Telephone Company will purchase a new switchboard.

FAIRVIEW, ILL.—The Fairview and Rapatee Telephone Company will rebuild its line.

ST. DAVID, ILL.—The Fulton County Telephone Company will extend its lines.

KILBOURNE, ILL.—The Kilbourne Telephone Company has been purchased by John Boyle.

SALEM, IOWA.—The Salem Telephone Company has been purchased by the German-American Telephone Company.

WANETA, IOWA.—The Waneta Telephone Company will construct a new line.

MT. VERNON, IOWA.—The Cedar Rapids and Marion Telephone Company has purchased the Mt. Vernon Telephone Company and will greatly improve the system.

CARSON, IOWA.—The Carson Telephone Company has been purchased by Musson Brothers, who contemplate making extensive improvements in the spring.

SOUTH BEND, IND.—The South Bend Home Telephone Company will make improvements costing in the neighborhood of $30,000.

CONWAY SPRINGS, KANS.—The Home Telephone Company has been purchased by the Clearwater Telephone Company.

LEOTA, KANS.—The Leota Telephone System has passed into the hands of Russell Hubbard of Carwood.

NORTONVILLE, KANS.—The Farmers' Mutual Telephone Company will be turned over to a company of farmers who will greatly improve the system. H. W. Poos is manager.

WATERVILLE, KANS.—Henry Runkle has purchased the Blue Rapids Telephone Company's exchange at this place.

LYNNVILLE, KY.—The Lynnville Telephone Company, recently organized, will at once begin construction work. B. B. Pryor, manager.

PILOT OAK, KY.—The Pilot Oak Telephone Company will construct lines in the surrounding country.

SEDALIA, KY.—The Sedalia Telephone Company, recently organized, will construct lines in Graves county. A. K. Jones is manager.

FOLSOMDALE, KY.—The Home Telephone Company will install a new switchboard.

HARLAN, KY.—The Harlan Telephone Company will construct a line to Hagan, Va.

PAINTSVILLE, KY.—The Johnson County Telephone Company will install a local system and construct lines throughout the county.

MONROE, LA.—The Home Telephone Company will install a new switchboard.

BIG FALLS, MINN.—E. J. Holler has purchased the local telephone system.

HOMER, MINN.—The Homer Telephone Company contemplates constructing several additional branches during the year.

RUSHFORD, MINN.—The City and Farmers' Telephone Company contemplates the construction of additional toll lines.

MCINTOSH, MINN.—The Garden Valley Co-operative Telephone Company has purchased the local exchange and will improve and extend the same.

ST. CLOUD, MINN.—The Lake George Telephone Company will extend its lines.

PIPESTONE, MINN.—The Northwestern Telephone Exchange Company contemplates rebuilding its plant at this place.

BEATRICE, NEB.—The New Home Telephone Company is planning for the extension of its long distance lines.

VANDALIA, MO.—The Buffum Telephone Company will install new equipment in its local exchange.

HARVARD, NEB.—The Harvard Telephone Company is preparing to extend its service.

RATON, N. M.—The Independent Telephone Company has been purchased by Arthur Hewitt, Temple, Tex., and J. C. Midkill, Ozona, Tex.

COLUMBIA, MO.—The Columbia Telephone Company will make extensive improvements.

ELY, NEV.—The White Pine County Telephone Company contemplates extensive toll line construction.

DESMOIN, N. M.—The Clayton Texline Telephone Exchange, which recently secured a franchise in this place, will install a switchboard and build a line to Clayton.

COLUMBUS, N. D.—Paul S. Ware has acquired the ownership of the Columbus Telephone Company.

MOTT, N. D.—The Dakota and Montana Telephone Company will install several new exchanges.

AUSTINBURG, O.—The Austinburg Telephone Company will install a new switchboard.

NEW PHILADELPHIA, O.—The Tuscarawas County Telephone Company will improve and extend its service.

YORK, O.—The York Telephone Company is planning to extend its lines.

CHEROKEE, OKLA.—The Rural Telephone Company will install a system here.

PERRY, O.—The Perry Telephone Company will erect a new exchange building.

ADRIAN, O.—The Independent Telephone Company will install an automatic plant, at a cost of about $150,000.

DAYTON, O.—The Bell Telephone Company will construct a new branch exchange in the eastern portion of the city.

MUSKOGEE, OKLA.—The Pioneer Telephone and Telegraph Company is planning to spend $100,000 in improvements.

WINFIELD, KANS.—The Bell Telephone Company will convert its local plant into an all cable plant.

WICHITA, KANS.—The Missouri and Kansas Telephone Company contemplates the expenditure of $50,000 to $75,000 in improving its plant in this city.

SPRINGFIELD, MO.—The Ozark Bell Telephone Company will make extensive improvements in its system in this city.

OIL CITY.—The Petroleum Telephone Company has authorized the expenditure of $25,000 in improvements and extensions.

NORMAN, OKLA.—The Norman Telephone Company will make extensive improvements in its system during the year.

INDEPENDENCE, PA.—Claud Wyant of the Home Telephone Company, Wellsburg, W. Va., has purchased the property of the Chartier's Telephone Company.

WILKESBARRE, PA.—The Consolidated Telephone Companies of Pennsylvania has decided to spend $200,000 on an automatic exchange in this city.

ZION'S VIEW, PA.—The Rural Telephone Company will extend its lines.

PIERRE, S. D.—The Gas Belt Telephone Company recently purchased the lines of the Great Western Telephone Company and it is the intention to install ten new exchanges and construct 500 miles of new line. F. B. Rowe is manager of the company.

COLMAN, S. D.—The Moody County Telephone Company has purchased the telephone business of Miller Brothers and will make many improvements in the system.

ORANGE, TEX.—The Southwestern Telephone Company contemplates the expenditure of $15,000 in the improvements of its system in this city.

MALONE, TEX.—Langford Bros of Malone have purchased the Manning Telephone Company, which includes the exchanges at Malone and Penelope.

BROOKELAND, TEX.—The Sabine Valley Telephone Company will install a local exchange.

PORTSMOUTH, VA.—The Southern Bell Telephone and Telegraph Company will erect a new building.

TOYAH, TEX.—A. C. Vanhorn, owner of the local telephone system is planning to rebuild the local system.

ST. JOHNSBURY, VT.—The Citizens' Telephone and Telegraph Company will install a new switchboard.

LUCK, WIS.—The Equity Telephone Company will install a new switchboard.

PILSEN, WIS.—John Kozlek, John Jirsa, Joseph Kulhanek, and M. J. Suess are interested in the promotion of a farmers' telephone line.

MONROE, WIS.—The Monroe Telephone Company will improve its system.

DELAVAN, WIS.—The Wisconsin Telephone Company has purchased the property of the Walworth County Independent Telephone Company, with headquarters at this place.

ALEXANDRIA, VA.—The Capital City Telephone Company will make extensive improvements in its system.

ABERDEEN, SASK., CAN.—The Aberdeen and Rural Telephone Company, Ltd., has absorbed the Mutual Telephone Association, operating in this vicinity, and will make a number of changes and improvements.

ALVINSTON, ONT., CAN.—The Board of Trade contemplates the construction of rural telephone lines. J. Clark, secretary.

Western Electric Salesmen Meet

On January 29, during the week the sales organization of the Western Electric Company held its conference in Chicago, some of the old employees of the Chicago organization gathered at luncheon at the Grand Pacific hotel. While tid-bits were being disposed of many pleasant reminiscences were told of the pioneer days of telephony.

General regret was expressed that J. C. McDonnell, the traffic manager of the company, who was seriously ill, was unable to be present.

Those who attended the luncheon and the dates they entered the employ of the company are as follows: E. W. Bennett, 1874; J. C. Cannon ("Jack"), 1877; F. B. Uhrig, now western district supervisor of the company, located at Kansas City, 1881; D. L. Harmon ("Denny"), now a banker at Indiana Harbor, Indiana, 1883; C. D. Wilkinson, manager of the Minneapolis house, 1886; William Carpenter, of the Walworth and Neville Manufacturing Company, who entered the employ of the Western Electric Company in 1887; Rolo C. Hearsley, 1888, and E. S. Holmes ("Fatty"), now manager of the Indianapolis house, 1890.

These old timers in the business are already looking forward to next year, when they hope to have another luncheon as enjoyable as the one just held.

Wireless Equipment May Be Compulsory

Following the disaster to the steamship Republic, President Roosevelt in a message to Congress has recommended immediate legislation requiring within reasonable limitation, that ocean-going steamers carrying considerable numbers of passengers shall carry an efficient wireless telegraph equipment. It has been urged that any legislation by Congress shall allow the substitution of the wireless telephone for the wireless telegraph on the Great Lakes. A number of amendments have been offered to one or more of the wireless measures now before Congress, and should a bill be passed at this session it will probably differ quite considerably from the terms of any of the original bills.